

ADULT MATE PREFERENCES ARE NOT MORE CLOSELY ASSOCIATED WITH THE  
OPPOSITE-SEX PARENT THAN THE SAME-SEX PARENT: EXAMINATIONS  
FOCUSING ON BIRACIAL INDIVIDUALS AND PARENTAL ETHNICITY

BY

MARIE E. HEFFERNAN

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Doctoral Committee:

Professor R. Chris Fraley, Chair  
Assistant Professor Jaime Derringer  
Professor Brent Roberts  
Professor Dov Cohen  
Assistant Professor Brian Ogolsky

## ABSTRACT

The current research examines three perspectives on why people may prefer romantic partners who resemble their parents. The psychoanalytic perspective suggests that the opposite-sex parent will play a larger role than the same-sex parent in shaping adult mate preferences (Freud, 1905; 1927). Learning-based theories such as mere exposure and sexual imprinting, on the other hand, do not necessarily predict that the opposite-sex parent will play a larger role in shaping mate preferences (e.g., Lorenz, 1937; 1970). A final perspective, the cafeteria model, suggests that people's preferences for mates are largely random and unpredictable (Lykken & Tellegen, 1993).

Two studies of biracial individuals examined the influence of parental ethnicity on mate preferences to evaluate these three perspectives. Study 1 focused on romantic pairing or mate selection and Study 2 focused on romantic attraction. In Study 1 ( $N = 1,026$ ), women were slightly more likely than men to be involved with a romantic partner who matched their father's ethnicity. Likewise, men were slightly more likely than women to be involved with a romantic partner who matched their mother's ethnicity. However, these results were not robust to different ways of analyzing the data. For instance, when women and men were examined separately they were no more likely to be involved with a romantic partner who matched their opposite-sex parent's ethnicity than their same-sex parent's ethnicity. Additionally, both women and men were more likely to be involved with a romantic partner who matched at least one of their parents' ethnicities than a partner who was of a non-parental ethnicity. In Study 2 ( $N = 517$ ), women and men were more attracted to faces of their mother's ethnicity and faces of their father's ethnicity. In other words, biracial individuals preferred others who resembled the ethnicity of either of their parents. The preference for parent ethnicity was not stronger for the opposite-sex parent than the same-sex parent. Instead, compared with men, women showed an

even greater preference for faces that matched their parents' ethnicities, but men still preferred parent-matching faces over faces of other ethnicities.

Rather than suggesting that mate preferences are primarily based on the opposite-sex parent or that they are largely random and unpredictable, the pattern of results from the current research supports the perspective that mate preferences are based on both parents.

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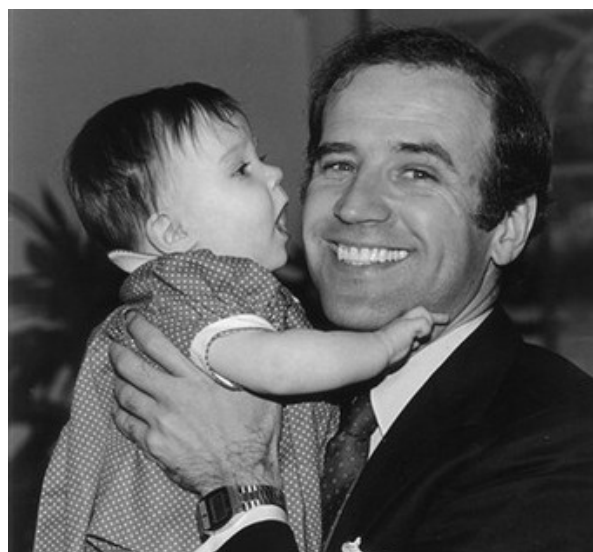
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## CHAPTER 1: INTRODUCTION

“It is an old and popular view that a man looks for a wife who is like his mother and a woman seeks a husband who is like her father.” – Aron et al., 1974, pp. 17

It is widely believed that women are inclined to marry men who resemble their fathers and, likewise, that men are likely to marry women who resemble their mothers. These beliefs are reinforced by salient examples of public figures, such as Ashley Biden, the daughter of Vice President Joe Biden, who married a man who looks quite similar to her VP father (see Figure 1).

*Figure 1. Ashley Biden with her husband, Dr. Howard Krein (left), and with her father, Vice President Joe Biden (right).*



Importantly, these ideas are not limited to lay theories of attraction; evidence from psychological research supports the idea that people are attracted to others who resemble their parents. It is important to note, though, that there is an assumption inherent in the opening quote



of this manuscript that the opposite-sex parent will matter more than the same-sex parent in shaping adult mate preferences. This assumption is a pervasive one. It has its origins in Freud's psychoanalytic theory of mate selection. According to Freud, the mother represents the first love object for young boys and the father represents the first love object for young girls. The result of this is that women are expected to seek partners who resemble their fathers and men are expected to seek partners who resemble their mothers across a variety of psychological and physical attributes.

Although this assumption underlies both lay and scientific theories of attraction, there is surprisingly little research that is designed to test it. It is certainly possible that adult mate preferences are based more on the opposite-sex parent than the same-sex parent. However, there are at least two alternatives that can explain the kinds of anecdotes that permeate our understanding of human attraction. One possibility is that people prefer romantic partners who resemble either of their parents. This is consistent with theories of mate preferences that emphasize general learning mechanisms, such as sexual imprinting. Importantly, if adult mate preferences are based on both parents, this can still explain anecdotes such as that of Ashley Biden. It may be that people are simply more likely to notice similarities between an individual's spouse and parent if the spouse and parent are the same sex, thus perpetuating the idea that the opposite-sex parent occupies a primary role in shaping preferences. Another possibility is that adult romantic preferences are not based on parents. If this is the case, the persistent idea that parents shape adult romantic preferences might be maintained in lay theories because people simply remember colorful examples like that of Ashley Biden, and perceive them to be more common than they actually are.

The goal of the current research was to provide a rigorous examination of the associations between romantic preferences and parental characteristics, and specifically, whether one parent matters more in the formation of adult romantic preferences. Next, I will review two theoretical viewpoints that offer alternative predictions concerning whether the opposite-sex parent might have a larger association with romantic preferences. Specifically, I will review theory and research from the psychoanalytic perspective and from a learning-based perspective. I will also discuss a third alternative, namely, that parents do not play a role in shaping adult romantic preferences. Finally, I will present two studies that were designed to test the extent to which the opposite-sex parent matters more than the same-sex parent in shaping people's preferences.

### **1.1 The psychoanalytic theory of mate preferences**

The psychoanalytic theory of mate preferences has been closely associated with the idea that people seek mates who are similar to their opposite-sex parent. According to psychoanalytic theory, sexuality emerges as early as infancy. As evidence for this, Freud suggested that the behaviors that characterize a mother-child relationship are, in fact, sexual in nature. For instance, stroking a child, kissing a child, and rocking a child are considered to be derived from the mother's own sexual life, and that by engaging in these behaviors she is teaching the child how to love (Freud, 1905; see also Bowlby, 1969).

Furthermore, a child's sexual impulses are directed "towards his parents, which are as a rule already differentiated owing to the attraction of the opposite sex – the son being drawn towards his mother and the daughter towards her father" (Freud, 1905, pp. 93). According to this viewpoint, parents are the first "love objects" and thus they form the prototype that people use when searching for a mate in adulthood. Therefore, finding a mate involves shifting libidinal energy from these early love objects to romantic partners. Both sexes purportedly start with the

mother as a love object. Subsequently, males retain the mother as the love object, but females come to resent their mothers as a result of penis-envy, causing a libidinal shift toward the father (Freud, 1927). Additionally, for males the mother is reinforced as the love object because males have early experiences in which the father deters their sexual activity and they develop a competitive relationship with him. Similarly, for females, the mother's watchful guardianship of sexual activity is expected to increase hostility with the mother, reinforcing the choice of father as love object (Freud, 1905). Thus, a strict interpretation of the psychoanalytic theory of mate preferences is that a man will seek love objects that are similar to his mother and a woman will seek love objects that are similar to her father.

## **1.2 Empirical review of the psychoanalytic theory of mate preferences**

In human attraction research, there is some evidence for the psychoanalytic theory of mate preferences. The seminal work on this topic utilized samples of 980 biracial Hawaiians (Jedlicka, 1980) and 7,171 "mixed nativity" Hawaiians (Jedlicka, 1984). Jedlicka (1980) examined the proportion of biracial individuals who had married twice between 1943 and 1967 and who married people that matched their mother's or father's ethnicity in both their first and second marriages. For first marriages, he found that women were more likely to have a spouse who matched their father's ethnicity (61.4%) than their mother's ethnicity (38.6%). The opposite pattern was found for men: men were more likely to have a spouse who matched their mother's ethnicity (58.6%) than their father's ethnicity (41.4%). Similar results emerged for second marriages. Women were more likely to have a second spouse who matched their father's ethnicity (63.5%) than their mother's ethnicity (36.5%), whereas men were more likely to have a second spouse who matched their mother's ethnicity (60.2%) than their father's ethnicity

(39.8%). Jedlicka argued that this pattern of results suggested that people will seek marriage partners who resemble the opposite-sex parent.

In a second paper, Jedlicka (1984) examined marriage records from a different group of Hawaiians who reported that their parents were of mixed nativity. Nativity was defined as place of birth (e.g., continental United States, Hawaii, Asia, Latin America). To ensure that marrying into a parent's nativity was not also reflective of marrying into one's own nativity, subjects were included only if they reported a different nativity from both of their parents. A final restriction was that subjects were married only once and that they married an individual of one of their parent's nativities (and not a distinct nativity) purportedly to ensure that nativity was relevant for the subject's mate choice.<sup>1</sup> Jedlicka compared the expected and observed proportions of brides and grooms who married into each parent's nativity. In general, he found that mother nativity more than father nativity was associated with mate choice for both sons and daughters. Despite this, sons were more likely than daughters to marry partners whose nativity matched that of their mother, and daughters were more likely than sons to marry partners whose nativity matched that of their fathers. Jedlicka argued that these results were consistent with the psychoanalytic theory of mate preferences whereby people prefer characteristics associated with the opposite-sex parent. Jedlicka also argued that the reason both sons and daughters may prefer spouses who are similar to their mothers is that women must shift their ideal romantic image ("idealized love object") from mother to father but this shift might not always happen. For men, the ideal romantic image is expected to remain focused on the mother, without shifting between parents.

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<sup>1</sup> Jedlicka notes that this particular restriction was also intended to ensure that the subject did not have a negative quality relationship with the parents. Although this restriction may be useful for other reasons such as narrowing the scope of the investigation (e.g., not focusing on individuals who married outside of both parents' nativities), it is not clear that this restriction would ensure a positive quality relationship between parents and child.

Beyond Jedlicka's widely cited findings, there is some additional research on opposite-sex parent effects and mate selection. For instance, research on physical characteristics indicates that people are more likely to select partners who share the same hair and eye color as their opposite-sex parent. Little and colleagues (2003), in a sample of 697 internet users, assessed the hair and eye color of participants, participants' romantic partners, and participants' parents. Using separate regression analyses for men and women that controlled for participants' own hair and eye color, the researchers found that for men, the best predictor for partner hair and eye color was maternal hair and eye color. For women, the best predictor for partner eye color was paternal eye color, but paternal hair color did not predict women's partners' hair color. The authors argued that this pattern of results indicated that individuals chose partners who resembled their opposite-sex parent over and above effects of self-resemblance or same-sex parent resemblance.

Additionally, females' preferences for partner body hair may also vary as a function of fathers' characteristics. Rantala and colleagues (2010) found that women with hairy fathers were more likely to have hairy partners than women with less hairy fathers. Not only did this effect of father hairiness emerge for women's mate choice, it also emerged in women's physical preferences. Specifically, in another part of this study, women engaged in a forced-choice attractiveness rating task in which they were presented with two photographs of a man's torso: one in which he had natural body hair and one in which he was shaven. Women selected the photo that they found most attractive. Consistent with the hypothesis that the opposite-sex parent may influence adult mate preferences, women who had hairier fathers showed a greater preference for the hairy torso photos (Rantala, Polkki, & Rantala, 2010).

### 1.3 Critical review of research on the psychoanalytic theory of mate preferences

Jedlicka's research has often been cited as supporting the conclusion that people select mates who resemble their opposite-sex parent (e.g., Lieberman, 2006). However, there are several limitations of this research that constrain the conclusions that can be drawn from these classic studies.

First, due to restrictions on data accessibility, data from the 1980 report are only from individuals who married twice and who married a spouse of either their mother's or father's ethnic group for both marriages. Although this provides the benefit of testing whether the association between people's spouses and their opposite-sex parent persisted into second marriages, it also makes it more tenuous to generalize these results to broader groups of people. The 1984 study also placed strict restrictions on eligibility. For instance, participants were eligible only if they married into one of their parents' nativities *and* were not the same nativity as either of their parents. Because both studies had strict—and even unusual—eligibility criteria, the generalizability of the results is limited. Moreover, both studies utilized Hawaiian samples and it is possible that mate selection among Hawaiians is influenced by individual orientation toward race and ethnicity that is specific to Hawaii. This is not a limitation per se; the generalizability of findings from all studies is bound by the cultures in which they take place. Nonetheless, it would be useful to know whether this pattern emerges in other cultures too.

Second, in the 1980 study, although Jedlicka suggested that the association between spouse characteristics and the opposite-sex parent persisted into people's second marriages, it is not possible to know whether the persistence of this association into second marriages actually reflects an association with the opposite-sex parent per se or whether it reflects an association with the ex-spouse. In other words, it is possible that in second marriages people had a tendency

to remarry into their ex-spouse's ethnicity, rather than their opposite-sex parent's ethnicity. The data Jedlicka reported cannot be used to distinguish between these two possible explanations.

Finally, it is important to note that only one of Jedlicka's studies (1980) found a greater association between characteristics of the opposite-sex parent and the participant's spouse than the same-sex parent. In the second study (Jedlicka, 1984), the primary finding was that both men and women were more likely to marry someone of their mother's nativity than their father's nativity. Even though the primary result of the 1984 study was that mothers more than fathers were associated with mate choice for both sexes, Jedlicka argued that these findings supported the psychoanalytic theory of mate preferences and suggested that one reason mothers may continue to have an influence on women's mate choice is that some women may not shift the idealized love object from mother to father. An alternative interpretation of these results, however, is that they do not support the psychoanalytic theory of mate preferences that are based on the opposite-sex parent, and instead they point toward the precedence of the mother. Ultimately, Jedlicka's research does not provide strong evidence that the opposite-sex parent plays a larger role in shaping offspring mate preferences.

Indeed, other research on the psychoanalytic theory of mate preferences also has pointed toward the precedence of the mother similar to Jedlicka's 1984 results. Aron and colleagues (1974) surveyed engaged individuals about the nature of their relationships (e.g., responsiveness, trust) with their fiancé, mother, and father. They found that for both men and women, there was a greater degree of similarity between people's relationships with their fiancés and their relationships with their mothers than their relationships with their fathers. Moreover, the degree of relational similarity between fiancé and mother relationships was greater for women than for men. Rather than supporting the psychoanalytic prediction that favors the opposite-sex parent in

the development of mate preferences, the authors argued that their results suggested that both men and women seek to repeat in marriage the relationship they had with their mother (Aron et al., 1974; cf. Collins & Read, 1990).

Another shortcoming of the extant research on the psychoanalytic theory of mate preferences is that in Rantala et al.'s (2010) study on body hair preferences, the research did not explicitly test whether fathers' hair characteristics were more highly associated with mate choice than mothers' hair characteristics because the authors did not assess mothers' hair characteristics (Rantala et al., 2010). It might be assumed that only men vary in body hair and thus only fathers and not mothers would impact daughters' preferences for body hair. However, it is possible that mothers' body hair varied in subtle ways and this might have had an equal or greater impact on daughters' preferences compared with father's body hair. More generally, the Rantala findings are just as compatible with the psychoanalytic interpretation as they are with an alternative: that people find mates more attractive if they resemble either parent.

In sum, the empirical evidence for the psychoanalytic theory of mate preferences is actually quite scant. Jedlicka's work suffered from several limitations and importantly the results of his second study did not support the bolder predictions of psychoanalytic theory. Other work that has been taken as support for the opposite-sex hypothesis did not, in fact, explicitly examine whether the opposite-sex parent had a greater association with mate preference than the same-sex parent (Rantala et al., 2010). This leaves only one study (Little et al., 2003) that tested and supported the psychoanalytic prediction that the opposite-sex parent would play a larger role than the same-sex parent in shaping adult mate preferences. Given the inconsistent evidence, it is surprising that the psychoanalytic theory of mate preferences continues to pervade academic and lay theories of attraction. Next, I will discuss alternative theories that speak to the issue of



parental associations with romantic preferences but that do not predict a larger association with the opposite-sex parent.

#### **1.4 Learning-based theories for parental effects in romantic attraction**

Mere exposure, sexual imprinting, and optimal outbreeding all suggest that some kind of learning process occurs whereby young children learn the characteristics of their parents and these characteristics later come to shape what they look for in a mate. In contrast to the psychoanalytic theory of mate preferences, none of these theories make the prediction that the opposite-sex parent should play a greater role in calibrating preferences compared with the same-sex parent.

The most basic of the learning theories suggests that caregivers or parents may influence later preferences through *mere exposure* or *familiarity* effects (Zajonc, 1968). For instance, caregiver-resembling others may seem more familiar, leading them to be evaluated more positively relative to others who do not resemble one's caregiver. Social psychological research has established that people prefer familiar objects over less familiar objects (Kunst-Wilson & Zajonc, 1980) and this effect has been demonstrated in the realm of interpersonal attraction (Moreland & Beach, 1992). For instance, students were more attracted to confederate "students" who attended their class 15 times than confederates who had attended only 5 times.

Familiarity might lead to greater liking and attraction because familiar stimuli are easier to process, and ease of processing may be misattributed to liking. When stimuli are easy to process, they are considered more perceptually fluent (Bornstein & D'Agostino, 1994), and perceptual fluency has been shown to increase liking for stimuli (Reber, Winkielman, & Schwarz, 1998). It follows, then, that perceptual fluency might contribute to observed similarities between individual's romantic partners and the people with whom the individuals were raised.

Caregiver-resembling others may be more perceptually fluent, and this fluency might be attributed to liking or attraction. Thus, it is possible that people are attracted to individuals who resemble their caregivers because these individuals may seem familiar.

A second theory that emphasizes a learning process in the development of preferences is sexual imprinting, defined as phase-sensitive learning that takes place in early life (Aronsson, 2011). During this time, an individual's social experiences subtly influence his or her "search image" for what a future mate is expected to look like. One of the assumptions of this perspective is that there is a sensitive period in early life during which sexual imprinting occurs. This assumption differentiates sexual imprinting from mere exposure. Although both perspectives suggest that exposure to caregiver characteristics subtly shapes preferences, sexual imprinting adds that the timing of exposure matters whereas the mere exposure perspective does not. Specifically, according to a sexual imprinting perspective, exposure during a sensitive period in early life will have a greater effect on future mate preferences than exposure during other periods in life. Additionally, animal researchers suggest that sexual imprinting is enhanced by parental responsiveness to offspring's needs (Ten Cate, 1985), leading to the possibility that the quality of the parent-child relationship may moderate imprinting-like effects.

Finally, the optimal outbreeding perspective (Bateson, 1983), like sexual imprinting, suggests that a learning process leads people to find attractive the features that characterized the individuals they were surrounded with in early life. In addition, optimal outbreeding includes a second process, habituation, that weakens attraction to the specific individuals from one's early life. Thus optimal outbreeding is a dual process model, which suggests that upon encountering a potential mate, if the mate is too similar to one's caregivers, habituation will dominate and the potential mate will not be sexually appealing. On the other hand, if the potential mate is

drastically different from one's caregivers, he or she will not map onto one's search image, and again may not be sexually appealing. Sexual attraction would be greatest, therefore, when a potential mate is similar to caregivers, but not too similar.

Although mere exposure, sexual imprinting, and optimal outbreeding differ in subtle ways, a central component of all three theories is that a learning process is responsible for the acquisition of caregiver-calibrated preferences. Learning via mere exposure is compatible with both sexual imprinting and optimal outbreeding (Aronsson, Lind, Ghirlanda, & Enquist, 2011; Fraley & Marks, 2010). Importantly, none of these theories leads to the prediction that the opposite-sex parent would play a greater role than the same-sex parent in shaping adult mate preferences. Instead, these three learning-based theories suggest that the primary caregiver may have the greatest influence on preferences because the child would have had greater exposure to this person's characteristics. Next, I will review research on both non-human animals and humans that provides support for the learning-based theories of romantic attraction.

### **1.5 Ethological evidence for learning-based theories**

Animal research suggests that young animals learn the characteristics of their caregivers through a process called filial imprinting. Konrad Lorenz (1937, 1970), a Viennese ethologist, conducted some of the seminal research on this topic. In his classic studies with geese, Lorenz found that young goslings would often imprint on the first moving object that they saw. Under normal circumstances, this object was the animal's mother. However, Lorenz found that when the caregiving environment was manipulated, goslings would imprint on other objects as well. In fact, when Lorenz himself was the first moving object that his goslings saw, they directed their following behavior toward him as if he were their mother. Moreover, once these goslings reached sexual maturity they would direct their sexual advances toward humans (rather than

other geese), suggesting that early experiences not only helped goslings learn the characteristics of their caregiver, they also shaped the characteristics that the goslings sought in a mate. This process is referred to as sexual imprinting (Aronsson, 2011).

After Lorenz's seminal work, researchers began to use cross-fostering experimental designs to further study sexual imprinting in animals. In a typical cross-fostering experiment, young animals of one species are raised by adults of a different species. Using this method, researchers have found, for example, that zebra finches raised by Bengalese finches later preferred to mate with Bengalese finches over zebra finches (Immelmann, 1969). Similarly, cross-fostered sheep and goats preferred to mate with animals of their foster parents' species rather than their own species (Kendrick, Hinton, Atkins, Haupt, & Skinner, 1998). Young animals will even imprint on artificial markings on their parents (Ten Cate & Bateson, 1989; Witte & Caspers, 2006). In one study, young Japanese quail, who are naturally brown, were raised by white quail with dots painted on them with hair dye. Subsequently, when they reached sexual maturity, the Japanese quail preferred to mate with adults who were also painted with dots rather than wild-type quail (Ten Cate & Bateson, 1989). Finally, anecdotal evidence from a variety of animal species also is consistent with sexual imprinting. For instance, zoo animals often direct their sexual attention toward zookeepers (Wilson, 1987), pets are known to attempt to mate with their human caretakers (Wilson, 1987), and human-raised chimpanzees direct sexual attention toward humans (Morris, 1969).

Animal research that has addressed the issue of whether one parent matters more than the other in sexual imprinting has been inconclusive. For example, when zebra finches were raised by a mother and father that had differing morphologies, female zebra finches preferred mates of their father's morphology (Vos, 1994) and male zebra finches preferred mates of their mother's

morphology. However, other research showed that female zebra finches preferred mates of their mother's morphology and not their father's morphology (Vos, 1995). One potential explanation for why both male and female zebra finches might develop a preference for their mother's morphology is that mothers tend to provide more parental care (Ten Cate, 1982) even though both parents are involved in caring for young (Ten Cate, 1985). Because social interaction is known to be an important factor in sexual imprinting for the zebra finch, more mothering relative to fathering may account for a general preference for the mother's features across offspring sex (Vos, 1995).

### **1.6 Evidence for learning-based theories from human attraction research**

Research on a variety of caregiver characteristics has supported the possibility that the features of people's caregivers may be considered more sexually attractive in adulthood. Much of this research focuses on attraction rather than mate selection. This is important because many factors besides what a person finds attractive influence mate selection and marriage. For instance, getting married does not involve a unilateral decision, but a negotiation that often takes time. Other factors like competition for mates and access to potential mates can constrain a person's mate options. Thus, focusing on attraction rather than mate selection bypasses the physical and social constraints that influence with whom a person can pair.

One caregiver characteristic that has been examined with respect to sexual attraction is smoking. Aronsson and her colleagues (2011) assessed participants' sexual attraction to people who smoked, and also assessed the smoking habits of participants and their parents. Because there was a limited sample of female participants, only data from males (both heterosexual and homosexual) were analyzed. Their data indicated that heterosexual males reported greater attraction to smoking if their mother or both parents smoked than if neither parent smoked. The

authors reported that there was no effect of just the father smoking for heterosexual participants. However, based on their bootstrapped 95% confidence intervals, it appears that there may have been a marginal effect of father smoking for heterosexual participants. Homosexual male participants reported higher attraction to smoking if their mother, father, or both parents smoked compared with homosexual males whose parents did not smoke. Participants' own smoking habits were not associated with their preference for smoking. The authors argued that their results indicated a sex-specific association between parent characteristics and preferences such that for heterosexual males, only the mother's smoking habits were associated with subsequent preferences, whereas for homosexual males, both mother's and father's smoking habits were associated with subsequent preferences. However, it is important to note that for homosexual males, mother's smoking habits still displayed a larger association with preferences than father's smoking habits. More importantly, Aronsson et al.'s argument for a sex-specific association between parents and preferences is limited by the fact that female participants were not included in the analyses. On the whole, their results point toward a general association between parental smoking and subsequent preferences.

Another parental characteristic that has been associated with adult romantic preferences is maternal pregnancy and lactation (Enquist et al., 2011). In this study, male and female participants reported whether they were sexually attracted to pregnant and lactating women, and reported whether they were an older or younger sibling. Results indicated that older siblings were more likely than younger siblings to be sexually attracted to pregnancy and lactation. The researchers reasoned that older siblings were more likely to have been exposed to maternal pregnancy and lactation in their childhood compared with younger siblings. Importantly, although their sample was 85% male, the same associations held for both male and female

respondents, suggesting that the mother influenced sexual preferences for both male and female offspring. Additionally, the results of this study provided the first evidence for a sensitive period in human development during which caregiver characteristics have the greatest impact on sexual preferences: exposure to maternal pregnancy and lactation was only associated with adult preferences if the exposure occurred between 1.5 and 5 years of age.

Parental age is another characteristic that has been examined with respect to adult mate preferences. Heffernan and Fraley (2013) examined how parental age may subtly shape people's age preferences. The authors assessed how old a participant's mother was when the participant was born and then asked participants to rate the attractiveness of 25 age-varying faces of their preferred sex. In general, people reported greater attraction to younger faces than older faces. However, people born to older mothers were more attracted to older-looking faces compared with people born to younger mothers. These results are consistent with the idea that parental characteristics are associated with people's romantic preferences in adulthood (see also Perrett et al., 2002; Zei, Astolfi, & Jayakar, 1981).

In another study, Heffernan and Fraley (2015) examined people's attraction to faces of their same ethnicity compared with other ethnicities. Because on average people tend to be the same ethnicity as their parents, participant ethnicity was used as a proxy for parent ethnicity. Participants rated photographs of 25 target faces of varying ethnicities. Results indicated that people tended to prefer faces of their same ethnicity over other ethnicities. However, this "same-ethnicity preference" was attenuated for individuals who reported being biracial and for individuals who reported that they had been exposed to greater racial diversity when they were growing up. Additionally, Heffernan and Fraley (2015) examined a subset of participants who reported that they had a nanny when growing up. These participants showed a preference for the

nanny's ethnicity over other ethnicities (including their own ethnicity). Importantly, the preference for the nanny's ethnicity held even for participants who were not the same ethnicity as their nanny. Taken together, these results suggest that features of early caregivers may influence the kinds of features that people find attractive in adulthood.

However, there is a limitation in the aforementioned study (Heffernan & Fraley, 2015). When the authors assessed ethnicity, they only assessed participants' own self-reported ethnicity. This may not give an accurate representation of the ethnic background of participants' parents. Additionally, participants were only permitted to select one racial or ethnic category, then they separately indicated if they were biracial or not. As such, the ethnicity information collected from biracial participants was limited because it only referred to the ethnicity category participants self-identified with, and did not reflect the ethnic background of both of their parents. A further repercussion of this limited ethnicity assessment was that anyone who selected "other" as their ethnicity was eliminated from the sample because we were not able to connect their ethnicity with one of the ethnicities represented in the rated photographs. Moreover, individuals who were biracial or multiracial might have been particularly likely to select "other" if they felt that their ethnic background was not represented within the limited options for reporting ethnicity. This might have nontrivially reduced the number of biracial individuals in the analytic sample.

In summary, research suggests that parental characteristics may serve as a template on which offspring mate preferences are based. This has been demonstrated in both non-human animals and humans, supporting the learning-based theoretical perspective on the development of preferences. Next I will review two additional predictions that emerge from the learning-based theoretical perspective: 1) that the primary caregiver plays a larger role in the development of



mate preferences, and 2) that the quality of the parent-child relationship may moderate the association between parental characteristics and preferences.

### **1.7 Learning-based theories predict a larger role for primary caregiver**

Rather than suggesting that the opposite-sex parent will play a larger role in shaping mate preferences, learning-based theories lead to the prediction that the primary caregiver may play a larger role in calibrating offspring romantic preferences than other caregivers because offspring were exposed to the primary caregiver more than other caregivers. Thus, research findings that have pointed to a relatively larger association between romantic preferences and mothers' characteristics than fathers' characteristics (e.g., Aron et al., 1974; Jedlicka, 1984) may be reflecting the fact that, historically, mothers were more likely to be the primary caregiver than fathers.

### **1.8 Learning-based theories predict relationship quality may moderate effects**

Additionally, the learning-based theories also point to the possibility that the quality of the caregiver relationship may moderate the association between parent characteristics and preferences. Parental influences on human romantic preferences might be enhanced by parental responsiveness, which may manifest in secure attachment to the parent. For instance, it is possible that people are attracted to caregiver-similar others only if they had a positive relationship with their caregiver. Indeed, there is already some support for this hypothesis. Focusing on the father-daughter relationship, Wiszewska and colleagues (2007) recruited a sample of female participants and their fathers. The women rated target faces for attractiveness and the fathers' faces were photographed. The researchers took facial measurements of the target faces and the father faces, and used a factor analytic technique to derive factor scores for different facial regions. Facial similarity scores between a women's highest rated target face and

her father's face were generated by correlating the factor scores for women's highest rated target face with the factor scores for fathers' faces. The women also reported on the quality of their relationship with their father during early childhood. There was a correlation between fathers' central facial characteristics and the facial characteristics of their daughter's most highly rated target face, but only for daughters who reported a positive relationship with their father in early childhood. The authors argued that the central region of the face may be particularly important either because women paid most attention to this area or because these areas of the face are the least prone to change over time, due to weight gain or loss, for example. These results suggest that the quality of the caregiver relationship may moderate the association between parent characteristics and their offspring's romantic preferences. A positive relationship with a caregiver increases one's attraction to caregiver-resembling others, whereas a negative relationship with a caregiver decreases one's attraction to caregiver-resembling others.

More support for this hypothesis comes from a study that used photos of adopted women, their husbands, and their adoptive parents (Bereckzei, Gyuris, & Weisfeld, 2004). Naïve subjects were asked to rate how similar a woman's husband was to the woman herself, her adoptive father, and her adoptive mother. Women's husbands were rated as more similar to the women's adoptive fathers than to the women themselves or to the women's adoptive mothers. Moreover, there was greater similarity between a woman's adoptive father and her husband if she reported receiving more emotional support from her adoptive father (Bereckzei et al., 2004).

Ethological researchers have suggested that in animals, parental responsiveness may enhance sexual imprinting thus increasing the attraction to parental characteristics (Ten Cate, 1985). Similarly, in humans it is possible that having a more positive and secure relationship with a parent would increase a person's attraction to parent-similar others. It is important to note

that although this idea is compatible with the learning theories of mate preferences, it is not necessarily incompatible with the psychoanalytic perspective.

### **1.9 Self-similarity as an alternative explanation**

A preference for self-similarity is a prominent alternative explanation for why people may be attracted to others who resemble their caregivers. This explanation suggests that people are attracted to self-similar others, and because people also tend to be similar to their parents, an association emerges between parents and romantic partners. Some studies have been positioned to rule out self-similarity, such as Bereckzei et al.'s (2004) adoptive sample, however others have not (e.g., Heffernan & Fraley, 2015).

### **1.10 The cafeteria model: Are parental effects on romantic preferences a myth?**

The goal of the much of the work presented thus far has been to uncover associations between people's romantic preferences and the characteristics of their parents. However, it is also possible that parents do not, in fact, shape their offspring's preferences. Furthermore, some scholars have argued that although human choice behavior is to some extent lawful and predictable, human mate selection is largely random and unpredictable (Lykken & Tellegen, 1993). Lykken and Tellegen focused on self-similarity as a predictor of mate choice and showed that even if there existed 10 mutually orthogonal variables on which spouses resembled each other with a correlation of  $r = 0.50$ , these variables would not be powerful predictors of any one individual's mate choice. For instance, if an individual scores at the mean for each of these 10 variables, this would only narrow his or her field of eligible partners to  $.97^{10} = 74\%$  of all eligible partners (of the individual's preferred sex, age range, etc.).

Lykken and Tellegen (1993) compared mate choice to a cafeteria setting to explain why self-similarity models are not capable of determining mate choice. Imagine that the field of

eligible partners is like an array of meal options in a cafeteria. Models of mate selection such as self-similarity may succeed in directing a person to the appropriate line in the mating cafeteria, the line that features dishes the person can afford and is accustomed to, however the self-similarity model does not succeed in predicting why the person chooses one dish over when it is time to make that choice.

The same “cafeteria model” metaphor is useful in explaining why parent-similarity may be equally incapable of determining mate choice. Similarity to a parent may be able to narrow the field of eligible mates, but may be unable to predict actual mate choice. If this were the case, lay theories that suggest otherwise (e.g., that men prefer women who resemble their mothers and women prefer men who resemble their fathers; Aron et al., 1974) could still persist because people may recall salient examples that support such lay theories (e.g., Ashley Biden’s husband who bears resemblance to her father, Vice President Joe Biden). Examples like this are novel and may be easily called to mind. Consequently, they may be perceived as more common than they are in reality (Kahneman & Tversky, 1973).

### **1.11 Overview**

Although the psychoanalytic theory of mate preferences persists in both lay theories of attraction and the academic study of romantic attraction, there is only tenuous evidence for a stronger association between the opposite-sex parent and romantic preferences than the same-sex parent. Some studies appear to support the conclusion that the opposite-sex parent plays a larger role in calibrating offspring preferences, but these studies have had various limitations such as focusing on only one parent (e.g., Enquist et al., 2011; Rantala et al., 2011) and using a unique sample of Hawaiians, who may be influenced by an individual orientation toward race and ethnicity that is peculiar to Hawaii, thus limiting generalizability (Jedlicka 1980, 1984). In fact,

only one study (Little et al., 2003) tested and found evidence for the theory that the opposite-sex parent had a larger impact on mate choice than the same-sex parent.

On the other hand, learning theories do not suggest a strict opposite-sex parent effect. Instead they predict a general effect of parents on romantic preferences and suggest that the primary caregiver will have the greatest impact on preferences. It is possible that research that has shown a stronger influence of the mother on later preferences (e.g., Aron et al., 1974; Jedlicka, 1984) is actually indicative of a primary caregiver effect rather than a mother-specific effect because historically, mothers were more likely than fathers to be the primary caregiver. Additionally, learning theories point to the possibility that the quality of the parent-child relationship may moderate the effect of parents on preferences. Some support for this prediction exists suggesting that associations between parent and partner characteristics are stronger for people who have more positive relationships with their parent (e.g., Wiszewska, et al., 2003; Bereckzei et al., 2003). However, this prediction is not necessarily incompatible with the psychoanalytic theory of mate preferences. Finally, as suggested by the cafeteria model, it is possible that parental characteristics are not associated with romantic attraction in adulthood. The goal of the proposed studies is to test these three alternative theories on the subtle influence of mothers and fathers in calibrating adult mate preferences.

### **1.12 Broader impacts**

The psychoanalytic idea that the opposite-sex parent provides a template upon which people's mate preferences are based is widely held and popular among lay people (Aron et al., 1974), and indeed even psychological researchers have represented the extant literature as supporting the conclusion that mate preferences revolve around the opposite-sex parent. For example, Lieberman (2006) stated: "In humans, a body of research suggests that individuals use

information about their opposite-sex parent (in the case of heterosexuals) to guide mate preferences.” However, the literature as it currently exists is not well positioned to support such a claim. The present research will help to determine whether, in fact, the effects on mate preferences are actually stronger for the opposite-sex parent than the same-sex parent. Therefore, the present research has the potential to dispel what may be a pervasive and persistent mischaracterization of the literature.

Additionally, some of the literature on this topic conflates psychodynamic theory with learning-based theories, such as sexual imprinting (Aronsson et al., 2011; Lieberman, 2006). For instance, Aronsson et al. (2011) argued that “sexual imprinting...takes place in a social context, and the parental effect has been shown to be sex specific” (p. 28), although no citation was given to buttress the claim that the parental effect is indeed sex specific. As I have mentioned before, unlike the psychoanalytic theory of mate preferences, sexual imprinting and the other learning-based theories do not necessarily predict a stronger association between mate preferences and characteristics of the opposite-sex parent (e.g., sex specific parent effects). The current research will disentangle these alternative theories of mate preferences. Next, I will present two studies in which I tested the competing predictions of the psychoanalytic theory, the learning-based theories, and the possibility that there is no effect of caregivers in the realms of romantic pairing (Study 1) and attraction (Study 2).

## CHAPTER 2: STUDY 1 – PARENT ETHNICITY AND PARTNER SELECTION

To test the psychoanalytic perspective, learning-based theories, and the cafeteria model of mate preferences, the first step is to attempt to replicate the seminal work on this topic conducted by Jedlicka (1980). In Study 1, I employed a design that is similar to Jedlicka's (1980) to determine how parental and spousal ethnicities are associated with one another. Specifically, in a sample of biracial individuals, I assessed whether people are more likely to be partnered with a romantic partner who matches their opposite-sex parent's ethnicity than their same-sex parent's ethnicity, as predicted by the psychoanalytic theory of mate preferences. The methods for this study were preregistered on Open Science Framework (<https://osf.io/zmrn7>) on August 12, 2014.

### 2.1 Method

*Participants.* Data were collected from over 70,000 individuals through an internet survey designed to assess personality and relationship variables. For the purpose of the present study, data were analyzed from 1,026 (774 women) participants who indicated that they were from the United States, were in a romantic relationship, had parents who were from different ethnic groups, who did not select "other" for their parents' or romantic partner's ethnicities, and who reported that their parents and romantic partner were each monoracial. The last two criteria were necessary for two reasons. First, the primary analysis was an attempt to replicate Jedlicka's (1980) findings and involved matching partner ethnicity with parent ethnicities, and there was too much ambiguity in matching based on "other." Second, in Jedlicka's original study (1980) he included only participants who were biracial (necessitating that each parent was monoracial).

In the final sample, 67.8% were in a dating relationship and 32.2% were married. The average relationship length was just under five years (59.81 months) and the average age was 30.99 years. The majority of the sample were heterosexual (93.6%). All participants were

considered biracial because they reported that their mother and father were not the same race (Jedlicka, 1980). Additionally, 70.0% of participants, when asked, explicitly self-identified as biracial. Participants' mothers' ethnicities were as follows: 48.7% Caucasian/White, 24.0% Latino or of Spanish origin, 16.0% Asian/Pacific Islander, 4.2% American Indian or Alaska Native, 3.9% Black/African American, 1.9% Middle Eastern, 0.8% Native Hawaiian or other Pacific Islander, and 0.6% Indian or Pakistani. Participants' fathers' ethnicities were as follows: 44.6% Caucasian, 27.6% Latino or Spanish origin, 10.8% Black/African American, 5.5% Middle Eastern, 5.2% American Indian or Alaska Native, 4.3% Asian/Pacific Islander, 1.1% Native Hawaiian or other Pacific Islander, and 1.0% Indian or Pakistani. Participants' romantic partners' ethnicities were as follows: 76.9% of partners Caucasian/White, 10.1% Latino or Spanish origin, 8.1% Black/African American, 3.5% Asian or Pacific Islander, 0.7% Middle Eastern, 0.5% American Indian or Alaska Native, and 0.2% Native Hawaiian or other Pacific Islander.

The final sample size ( $N = 1,026$ ) was larger than the minimum pre-registered sample size ( $N = 785$ ) because data collection continued until I was ready to analyze the data (through January 27, 2015). At that time, the data were downloaded. The preregistered sample size was calculated using G\*Power software (Faul, Erdfelder, Buchner, & Lang, 2009) and is the sample size necessary to detect a small effect,  $w = 0.10$  (equivalent to a Pearson  $r$  of 0.10), for a chi-square test with 1 degree of freedom with 80% power.

*Procedure.* The survey was administered on the website, [www.yourpersonality.net](http://www.yourpersonality.net), which contains a variety of web studies related to personality, attachment, and close relationships. The host site can be found via key word searches for terms associated with personality and relationships. It receives approximately 1,000 visitors per day, however not all visitors participate in each study posted on the web site.



Participants provided demographic information as part of a larger study on relationships. Participants reported whether they were biracial, as well as the ethnic background of their mother, father, and romantic partner. There were 31 ethnic background options, which were based on recommendations and examples from the 2010 United States Census (U.S. Census Bureau, 2012), guidelines from the National Center for Education Statistics (U.S. Department of Education, n.d.), and the 2006 American Community Survey report on the most populous ancestry groups in the United States (U.S. Census Bureau, 2006). Participants also had the option to select “some other racial category” and to type a free response. All study items are provided in Appendix A.

*Analytic plan.* Consistent with Jedlicka’s (1980) analyses, the pre-registered primary analysis was a chi-square test to compare the proportions of men and women whose spouses match either their mother’s or father’s ethnicity. Specifically, I assessed whether a greater proportion of women were paired with men of their father’s ethnicity and whether a greater proportion of men were paired with women of their mother’s ethnicity. If this were the case, it would suggest that people’s preferences are more closely associated with the opposite-sex parent, consistent with the psychoanalytic theory of mate preferences. If, on the other hand, similar proportions of women and men were paired with partners of their mother’s and father’s ethnicities, and moreover, if people were more likely to be paired with a partner of either parent’s ethnicity than with a partner of a different ethnicity, it would be more consistent with the learning-based theories such as mere exposure. It is also possible that there is no association between the ethnicity of people’s parents and the ethnicity of their spouses. This would be consistent with cafeteria model of mate selection suggesting that mate selection may be random and unpredictable (Lykken & Tellegen, 1993).

I also conducted auxiliary analyses to assess whether the pattern of results was dependent on the way ethnicity was assessed or the specific subsamples of people that were examined.

## 2.2 Results

*Primary analysis: Examining whether people are more likely to be paired with a romantic partner of the opposite-sex parent's ethnicity.* To replicate Jedlicka (1980), I first collapsed participants' responses about the mother's, father's, and romantic partner's ethnicities from the 31 categories listed in Appendix A into eight broader categories. This was done because some participants selected several response options for one person (e.g., reporting that their mother was Irish, German, Polish, and Caucasian/White) but the person's ethnic background could be reflected by just one ethnicity category (e.g., Caucasian/White). The 31 ethnicity response options were collapsed into eight broader categories as follows: 1. Asian/Pacific Islander (Chinese, Filipino, Japanese, Korean, Vietnamese, Other Asian), 2. Black/African American (African American, Black), 3. Caucasian/White (English, German, Irish, Italian, Polish, White or Caucasian, Other European origin), 4. Latino or Spanish origin (Cuban, Mexican, Other Central American origin, Puerto Rican, South American origin, Spanish origin), 5. Middle Eastern (Middle Eastern), 6. American Indian or Alaskan Native (Alaskan Native, American Indian), 7. Native Hawaiian or other Pacific Islander (Gaumanian or Chomorro, Native Hawaiian, Other Pacific Islander, Samoan), and 8. Indian or Pakistani (Indian, Pakistani). These broader categories were based on broad categories provided by the United States Census (U.S. Census Bureau, 2012).

Next, for each participant I determined whether his or her romantic partner was the same ethnicity as the participant's mother or the same ethnicity as the participant's father. Because participants were eligible for the primary analysis only if both of their parents were monoracial

and their romantic partner matched one parent's ethnicity, this meant that all participants were involved with a partner who matched either their mother's or father's ethnicity, and there were no participants for whom their romantic partner matched both their mother's and father's ethnicities.

I conducted a chi-square test to determine whether men or women were more likely to be involved with a romantic partner who matched their mother's or their father's ethnicity. Women were more likely to have a partner who matched their father's ethnicity (51.4%) than their mother's ethnicity (48.6%). Men were more likely to have a partner who matched their mother's ethnicity (55.4%) than their father's ethnicity (44.6%). The chi-square test suggested this finding was not significant,  $\chi^2 = 3.51$ ,  $df = 1$ ,  $p = .06$ . Results are presented in Table 1.

Although the overall test was not statistically significant, the overall pattern of matches seemed somewhat consistent with Jedlicka's findings. Therefore, I performed some more in-depth analyses by examining partner matching separately for women and men with one-way chi-square tests. These within-sex tests suggested that women were, in fact, no more likely to have a partner who matched their father's ethnicity than their mother's ethnicity,  $\chi^2 = 0.63$ ,  $df = 1$ ,  $p = .43$ . Similarly, men were no more likely to have a partner who matched their mother's ethnicity than their father's ethnicity,  $\chi^2 = 2.90$ ,  $df = 1$ ,  $p = .09$ . Although the overall chi-square analysis replicated the pattern of results that Jedlicka (1980) reported, the one-way chi-square tests do not. Instead, these one-way tests suggest that women and men are no more likely to have a partner of the opposite-sex parent's ethnicity than the same-sex parent's ethnicity.

Additionally, it is important to point out the effect size of the overall chi-square analysis in the present study is much smaller than the effect size reported in Jedlicka (1980). In the current study, the effect size is equivalent to a correlation of  $r = .06$ , 95% CI [-0.0027, 0.1193].

Jedlicka (1980) did not report an effect size or exact  $p$ -value, but these statistics can be calculated from the data that were provided. In Jedlicka's (1980) study, the chi-square test with respect to first marriages was  $\chi^2 = 37.74$ ,  $df = 1$ ,  $p < .01$ , which translates into an effect size equivalent to a correlation of  $r = 0.20$ , 95% CI [0.14, 0.26]. To compare the results from these two studies I tested the difference in the effect size ( $r$ ). This test indicated that the impact of the opposite-sex parent was smaller in the current study than in the Jedlicka (1980) study,  $z = -3.19$ ,  $p < .01$ .

*Analysis using more detailed ethnicity categories.* I conducted the same chi-square analysis using more nuanced ethnicity categories. In this case, participants were eligible if they selected one of the 31 ethnic categories for mother ethnicity (excluding "other") and a distinct ethnic category for father ethnicity, and if their romantic partner matched one of these two parental ethnicities ( $N = 1,125$ ; 839 women). For example, a participant would be eligible for this analysis if she reported that her mother was Filipina and her father was Japanese even though both of these ethnicities are sometimes categorized under a broader ethnic group of Asian. The five most frequent narrow ethnicities for mother were: White or Caucasian (41.2%), Mexican (5.8%), German (9.0%), English (5.5%), and Italian (5.0%). The five most frequent narrow ethnicities for father were: Caucasian (31.4%), Mexican (9.0%), German (7.5%), Italian (6.7%), and Other European origin (6.6%). The five most frequent narrow ethnicity categories for romantic partner were: Caucasian (63.7%), Other European origin (5.8%), African American (5.3%), Mexican (4.3%), and English (4.1%).

Using these more nuanced ethnicity categories, women were more likely to have a partner who matched their father's ethnicity (52.0%) than their mother's ethnicity (48.0%), and men were more likely to have a partner who matched their mother's ethnicity (57.7%) than their

father's ethnicity (42.3%),  $\chi^2 = 7.96$ ,  $df = 1$ ,  $p < .01$ . This is equivalent to a correlation of  $r = 0.08$ , 95% CI [0.03, 0.14]. These results are similar to those found in the primary analysis. In terms of the magnitude of the effect size, these results are more similar to the results from the primary analysis in the present research,  $z = 0.46$ ,  $p = 0.65$ , than to the results from Jedlicka (1980),  $z = -2.8$ ,  $p < .01$ . I also examined partner matching separately for women and men with one-way chi-square tests. Women were no more likely to be paired with a partner who matched their father's ethnicity than their mother's ethnicity,  $\chi^2 = 1.30$ ,  $df = 1$ ,  $p = .25$ . Men, on the other hand, were more likely to be paired with a partner who matched their mother's ethnicity than their father's ethnicity,  $\chi^2 = 6.78$ ,  $df = 1$ ,  $p < .01$ . Therefore, it appears that the effect uncovered in the overall chi-square analysis using the more nuanced ethnicity categories was driven by men's greater likelihood to be paired with someone of their mother's ethnicity.

### 2.3 Auxiliary Analyses

*Analysis on subsample of participants who self-identified as biracial.* The primary analysis in this study was conducted on a sample of people who were considered biracial because their parents were from different ethnic groups, however 30.0% of this sample did not explicitly self-identify as being biracial. It is possible that the primary analysis might look different if it were conducted on only those individuals who self-identified as biracial. For instance, it may be that people who identify themselves as biracial are particularly likely to select romantic partners who match their opposite-sex parent's ethnicity. To examine this possibility, I re-conducted the primary analysis on the subsample of participants who self-identified as biracial ( $N = 711$ , 529 women). The results of this analysis were similar to the primary analysis. Women were more likely to have a partner who matched their father's ethnicity (52.2%) than their mother's ethnicity (47.8%). Men were more likely to have a partner who matched their mother's ethnicity

(55.5%) than their father's ethnicity (44.5%). The chi-square test suggested this finding was not significant,  $\chi^2 = 3.19$ ,  $df = 1$ ,  $p = .07$ ,  $r = 0.08$ , 95% CI [0.03, 0.14]. Again, the magnitude of the effect size is small in comparison to Jedlicka's (1980) original findings,  $z = -2.48$ ,  $p = .01$ . I also conducted one-way chi-square tests separately for women and men. Women who self-identified as biracial were no more likely to be paired with a partner who matched their father's ethnicity than their mother's ethnicity,  $\chi^2 = 1.00$ ,  $df = 1$ ,  $p = .32$ . Men who self-identified as biracial were no more likely to be paired with a partner who matched their mother's ethnicity than their father's ethnicity,  $\chi^2 = 2.20$ ,  $df = 1$ ,  $p = .14$ .

*Analysis including participants who were involved with romantic partners who did not match either parent's ethnicity.* Thus far, all analyses have been restricted to individuals who were involved with a romantic partner who matched one of the participant's parents' ethnicities. This eliminates those people who were involved with a romantic partner who was a different ethnicity than both of their parents. Therefore, I conducted additional analyses that included individuals who were involved with a romantic partner who did not match either of their parents' ethnicities ( $N = 1,188$ , 901 women). First, I conducted an overall chi-square test. For women, 44.3% had partners who matched their father's ethnicity, 41.7% had partners who matched their mother's ethnicity, and 14.1% had partners who did not match either parent's ethnicity. For men, 48.4% had partners who matched their mother's ethnicity, 39.0% had partners who matched their father's ethnicity, and 12.5% had partners who did not match either parent's ethnicity. However, the overall chi-square test suggested that there was no difference between women and men in terms of whether their partner matched their mother's ethnicity, father's ethnicity, or neither parent's ethnicity,  $\chi^2 = 3.98$ ,  $df = 2$ ,  $p = .14$ .

To examine this issue more closely, I also conducted one-way chi-square analyses separately for women and men to determine whether women and men were more likely to be paired with a partner who matched either parent's ethnicity versus a partner who did not either parent's ethnicity. Women were more likely to have a partner that matched one of their parents' ethnicities (85.9%) than a partner who did not (14.1%),  $\chi^2 = 464.61$ ,  $df = 1$ ,  $p < .01$ . Men were also more likely to have a partner who matched one of their parents' ethnicities (87.5%) than a partner who did not (12.5%),  $\chi^2 = 161.06$ ,  $df = 1$ ,  $p < .01$ . These results indicate that both women and men were much more likely to have a partner who matched one of their parents' ethnicities than a partner who did not match either of their parents' ethnicities. This provides support for the learning-based theories because people are demonstrating a preference for parental ethnicity over other ethnicities, and this preference is not dependent on whether the parent is the opposite-sex or not. Additionally, these results do not provide support for the cafeteria model because people are demonstrating a strong preference for parent ethnicity, rather than no preference at all.

*Separate analyses for participants who were married and those who were dating.* One difference between the current study and Jedlicka's (1980) study is that the current study included people who were in both marriage and dating relationships, and Jedlicka's study (1980) included only people who were married (specifically, people who had been married twice). It is possible that one reason the effect of the opposite-sex parent is more pronounced in the Jedlicka study is that this effect is stronger among married people than among dating people. To examine this possibility, I conducted chi-square analyses separately for people who were married and those who were dating. Among married people ( $N = 330$ ), women were about equally likely to have a spouse who matched their father's ethnicity (51.2%) or their mother's ethnicity (48.8%) and men were about equally likely to have a spouse who matched their mother's ethnicity

(51.2%) or their father's ethnicity (48.8%),  $\chi^2 = 0.15$ ,  $df = 1$ ,  $p = .70$ , equivalent to a correlation of  $r = 0.02$ , 95% CI [-0.09, 0.13]. On the other hand, among people who were in dating relationships ( $N = 695$ ), women were more likely to have a dating partner who matched their father's ethnicity (51.5%) than their mother's ethnicity (48.5%), and men were more likely to have a dating partner who matched their mother's ethnicity (57.3%) than their father's ethnicity (42.7%),  $\chi^2 = 4.02$ ,  $df = 1$ ,  $p = .05$ , equivalent to a correlation of  $r = 0.08$ , 95% CI [0.00, 0.15]. I also conducted follow-up one-way chi-square tests to examine dating women and men separately. Women in dating relationships were no more likely to be paired with a romantic partner who matched their father's ethnicity than their mother's ethnicity,  $\chi^2 = 0.49$ ,  $df = 1$ ,  $p = .48$ . For men, the one-way chi-square test was not significant, suggesting that men were not more likely to be paired with a romantic partner who matched their mother's ethnicity than their father's ethnicity,  $\chi^2 = 3.65$ ,  $df = 1$ ,  $p = .06$ .

To determine whether the association between partner ethnicity and parent ethnicity differs between married individuals and dating individuals, I compared the estimates of effect size ( $r$ ) from the overall chi-square tests. This comparison suggested that the association did not differ significantly between the two samples,  $z = -0.09$ ,  $p = 0.37$ . Thus the difference between Jedlicka's relatively larger effect size and the small effect size found in the current study is likely not attributable to differing relationship statuses between the respective samples.

*Separate analyses for heterosexual participants and gay and lesbian participants.*

Finally, the primary analysis was conducted on a sample that included a small proportion of gay and lesbian participants (6.4%). Because the psychoanalytic perspective has a heteronormative bias, there may be value in conducting the chi-square test separately for individuals who are heterosexual and individuals who are homosexual. Among heterosexual participants, the pattern



of results is similar to that in the full sample: women were more likely to have a partner who matched their father's ethnicity (52.1%) than their mother's ethnicity (47.9%), and men were more likely to have a romantic partner who matched their mother's ethnicity (55.3%) than their father's ethnicity (44.7%),  $\chi^2 = 3.95$ ,  $df = 1$ ,  $p = .05$ , equivalent to a correlation of  $r = 0.06$ , 95% CI [0.00, 0.13]. One-way chi-square tests suggested that heterosexual women were no more likely to have a partner who matched their father's ethnicity than their mother's ethnicity,  $\chi^2 = 1.33$ ,  $df = 1$ ,  $p = .25$ , and heterosexual men were no more likely to have a partner who matched their mother's ethnicity than their father's ethnicity,  $\chi^2 = 2.66$ ,  $df = 1$ ,  $p = .10$ . The overall association among heterosexuals was not different from the current primary analysis,  $z = 0.00$ ,  $p = 0.50$ , but was significantly smaller than the association in Jedlicka (1980),  $z = 3.14$ ,  $p < .01$ .

For gay and lesbian participants, women were more likely to have a partner who matched their mother's ethnicity (60.6%) than their father's ethnicity (40.0%), and men were more likely to have a partner who matched their mother's ethnicity (53.8%) than their father's ethnicity (46.2%),  $\chi^2 = 0.16$ ,  $df = 1$ ,  $p = .69$ , equivalent to a correlation of  $r = 0.05$ , 95% CI [-0.20, 0.30]. However, the results from the subsample of gay and lesbian participants should be interpreted with caution because they are based on only 58 individuals.

## 2.4 Summary

The results from Study 1 are not fully consistent with the expectations of the psychoanalytic framework. Although some of the analyses revealed statistically significant results, those results were not robust across alternative ways of analyzing the data. Moreover, if anything, the data seemed to suggest that women are equally likely to pair with a partner who matches their mother's ethnicity as they are to pair with a partner who matches their father's ethnicity, and likewise men are equally likely to pair with a partner who matches their mother's

or their father's ethnicity. Importantly, these data show that both women and men are much more likely to pair with a romantic partner who matches either one of their parents' ethnicities than a romantic partner who does not match either parents' ethnicities. These data do not support the idea that mate selection is largely random and unpredictable. Therefore, these data are more consistent with the learning-based theories of mate preferences than with the cafeteria model or the psychoanalytic perspective.

### CHAPTER 3: STUDY 2 – PARENT ETHNICITY AND ATTRACTION

Many factors besides early caregiver experiences are likely involved in selecting a mate, dating, and marriage. For instance, mate selection is constrained by the potential mates one has access to, one's own mate value, and mutual agreement (Diamond, 1992). In particular, mate selection is likely to be constrained by propinquity. People cannot easily pair with partners who are physically distant from them or whom they never meet. So it is possible that one reason people tend to have partners that are the same ethnicity as one of their parents is that the people they are surrounded with tend to be the same ethnicities as their parents. As such, there may be an advantage in examining *attraction* rather than mate selection because attraction is less likely to be constrained by these other factors. Study 2 is designed to examine parental influence on attraction rather than marriage or pairing.

In Study 2, I assessed whether people were more attracted to targets of their opposite-sex parent's ethnicity than their same-sex parent's ethnicity. I conducted additional analyses to address questions such as whether people show an amplified preference for one parent's ethnicity if that parent was the primary caregiver, whether the quality of the parent-child relationship moderates parental effects on preferences, and whether self-identifying with one parent influences people's preferences. The methods for this study were preregistered on Open Science Framework (<https://osf.io/zmrn7/>) on August 12, 2014.

#### 3.1 Method

*Participants.* Data were collected from 616 participants recruited from Amazon's Mechanical Turk. The study description stated that the study was specifically designed for people who were biracial and whose ethnic background represented some combination of Asian/Pacific Islander, Black/African American, Caucasian/White, and Latino/Spanish origin.

People who indicated that their parents were of a different ethnic background than these four options were redirected to a page that indicated they were ineligible for the study, and they did not complete any further tasks for remuneration. The final sample consisted of 517 participants (233 women) who were North American, self-identified as biracial, had not taken the survey before, and whose mother and father belonged to different ethnicity groups (Asian/Pacific Islander, Black/African, Caucasian/White, or Latino/Hispanic). These four ethnicity groups were chosen for two reasons. First, they are the most prevalent ethnicity groups in the United States (U.S. Census Bureau, 2014). Second, participants engaged in an attractiveness rating task in which they rated the attractiveness of target individuals who either matched their mother's or their father's race. As such, it was important to be able to match parents' ethnicities with the ethnicity of the target individuals, and doing this kind of matching with all ethnic groups was prohibitively complex.

In the final sample, 35.0% of participants were single, 34.4% were in a dating relationships, and 30.6% were married. Participants were not asked explicitly about their sexual orientation, but they were asked to select the sex to which they were primarily attracted so they could rate photos of that sex. Based on this question and participants' own sex, the majority of the sample were heterosexual (82.4%), meaning that the sex they were primarily attracted to was not their own sex. Participants' mothers' ethnicities were as follows: 37.9% Caucasian/White, 25.1% Asian/Pacific Islander, 20.3% Latino or of Spanish origin, and 16.6% Black/African American. Participants' fathers' ethnicities were as follows: 46.2% Caucasian/White, 27.9% Black/African American, 17.2% Latino or of Spanish origin, and 8.7% Asian/Pacific Islander.

To confirm that participants accurately reported that their parents were from different ethnic groups, participants re-reported on their parents' ethnicities at the end of the online survey

and were only selected for the analytic sample if they provided the same ethnicity for each parent both at the beginning of the survey and at the end of the survey. This technique has been utilized in other studies on biracial individuals (Gaither, S., personal communication, date: Feb. 26, 2014).

Although I collected data from a sample that was larger ( $N = 616$ ) than the preregistered sample size ( $N = 546$ ), the final sample size ( $N = 517$ ) was smaller than the pre-registered sample size because some participants did not meet the eligibility criteria. The stopping rule for data collection was based on funding resources. I collected data until graduate research funds were exhausted. The preregistered sample size was the sample size necessary using multiple regression techniques with three predictors to have 80% power to detect an effect that is equivalent to  $F^2 = 0.02$  (Faul, et al., 2009). Even though the final sample is smaller than the preregistered sample size, the impact on statistical power may be minimal because the study involved 80 repeated measurements within person.

*Stimuli Selection.* To create the face attractiveness rating task, I first selected 140 photographs of men and 140 photographs of women that represented people of varying ethnic backgrounds. The photographs were obtained with permission from [facity.com](http://facity.com)—a website that hosts facial photographs of people from various countries around the world. All photographs are taken in a standardized fashion (i.e., a standard distance, with the subject's hair pulled back, and minimal cosmetic make-up and jewelry). I have used similar face attractiveness rating tasks in the past (e.g., Heffernan & Fraley, 2013).

Next, I administered two facial rating tasks online using Amazon's Mechanical Turk. The first was a prototypicality rating task in which participants of different racial backgrounds rated the racial or ethnic prototypicality of faces of their preferred sex. Specifically, the instructions

were: “Please take a moment to look at the picture, then rate how characteristic the face is of each racial or ethnic group below.” Participants provided a rating on a 1 (Not characteristic) to 5 (Very characteristic) scale for each of four ethnic groups (Asian/Pacific Islander, Black/African American, Caucasian/White, and Latino/Spanish origin).

The second facial rating task was an attractiveness rating task in which participants of different racial backgrounds rated faces of their preferred sex for attractiveness. The instructions for this task were: “Please take a moment to look at the picture, then rate how attractive you think the person in the picture is.” Participants rated each face on a 1 (Very unattractive) to 5 (Very attractive) scale. For both the prototypicality and the attractiveness rating tasks, between 12-30 people rated each face.

I selected 20 male and 20 female faces for each racial group based on two criterion. The first criterion was that the face was rated as highly prototypical of one race, on average, and less prototypical of other races. This criterion yielded only 21 faces that were prototypical for Asian men and 22 faces that were prototypical for Latina women. For this reason, the final number of faces for each sex selected for each ethnicity group was reduced to 20 faces from the preregistered 25 faces. For each face, I calculated three difference scores that represented the difference between the ethnicity for which the face was rated most prototypical and each of the other three ethnicity ratings. Averages of these difference scores for the final face stimuli are presented in Table 2. For example female photos that were rated as most prototypical of Asian ethnicity had average difference scores of  $d = 5.81$  with Black/African American ratings,  $d = 4.01$  with Caucasian/White ratings, and  $d = 4.38$  with Latino/Spanish origin ratings. All of the average difference scores were greater than 1 with the exception of the difference score between female photos that were rated as most prototypical of Latina ethnicity and the average difference

score with Caucasian/White ratings ( $d = 0.84$ ). It should be noted that in general, the Latina/o photos had the lowest difference scores.

The second criterion was that the face was rated as average or moderate attractiveness. From the pool of faces that were prototypical of each race, I selected faces that were rated as moderately attractive. Specifically, I started with the two groups that had the fewest prototypical faces (Asian men and Latina women) and selected the 20 faces that were rated as moderately attractive (e.g., I eliminated the faces that received the very highest or lowest attractiveness ratings). Then, within each sex, I selected faces that represented a similar range of average attractiveness scores so that within each sex, every ethnicity group had a similar range of attractiveness and similar average attractiveness ratings (see Table 2). The average attractiveness ratings for each group of 20 final selected faces were as follows: Asian female photos,  $M = 2.70$ ,  $SD = 0.23$ ; Black/African American female photos,  $M = 2.70$ ,  $SD = 0.34$ ; Caucasian/White female photos,  $M = 2.70$ ,  $SD = 0.35$ ; Latina/Spanish origin female photos,  $M = 2.69$ ,  $SD = 0.40$ ; Asian male photos,  $M = 2.40$ ,  $SD = 0.43$ ; Black/African American male photos,  $M = 2.45$ ,  $SD = 0.53$ ; Caucasian/White male photos,  $M = 2.42$ ,  $SD = 0.44$ ; Latino/Spanish origin male photos,  $M = 2.58$ ,  $SD = 0.42$ .

With the final 80 female and 80 male faces, I created an attractiveness rating measure. Examples of the faces used as final stimuli are provided in Appendix B.

*Procedure.* Participants were paid \$0.75 for completing an online survey through Amazon's Mechanical Turk. In this survey they provided demographic information such as their parents' ethnicities. Then they engaged in the attractiveness rating task in which they rated the attractiveness of 80 faces of their preferred sex, including 20 faces that matched the participant's mother's race and 20 faces that matched the participant's father race. The faces were presented in

present in random order for each participant and participants rated each face on a 1 (Very Unattractive) to 5 (Very Attractive) Likert scale.

Next, participants reported on their relationships with their parents. Specifically, they completed a measure of attachment security with each parent (ECR-RS: Fraley, Heffernan, Vicary, Brumbaugh, 2011). This scale assesses attachment avoidance, which reflects the degree to which people feel comfortable with closeness with the parent (e.g., *“I prefer not to show this person how I feel deep down”*); and attachment anxiety, which reflects degree to which they worry that the parent may not care for them or be available to them in times of need (e.g., *“I’m afraid this person may abandon me”*). All items on this scale were rated on a 1 (Strongly Disagree) to 7 (Strongly Agree) Likert scale. The items demonstrated high levels of alpha reliability for avoidance with mother ( $\alpha = .92$ ), anxiety with mother ( $\alpha = .91$ ), avoidance with father ( $\alpha = .92$ ), and anxiety with father ( $\alpha = .94$ ). These items also demonstrated high levels of alpha reliability when they were aggregated together to form a scale for attachment security with each parent: mother ( $\alpha = .92$ ) and father ( $\alpha = .93$ ).

Due to a coding error, data were not initially collected regarding who served as a participant’s primary caregiver. However, all participants who were eligible for the final sample were re-contacted and asked to complete a follow-up question for \$0.15 payment. The follow-up question was, *“Who was your primary caregiver when you were growing up?”* and the response options were: my mom, my dad, both my mom and my dad had equal roles in raising me, and someone else. Of the 517 eligible participants, 314 (60.74%) completed the follow-up question.

To examine the effect of self-similarity on attraction, participants reported whether they self-identified more strongly with one parent’s ethnicity, or if they identified equally with both parents’ races. Finally, to further explore how diversity exposure is associated with preferences,



participants completed a three item diversity exposure measure (Heffernan & Fraley, 2014). This included items such as, “*Growing up, I had friends who were of different racial backgrounds than me.*” The three items were rated on a 1 (Strongly Disagree) to 7 (Strongly Agree) scale. Although in our previous work the items on this scale have demonstrated high levels of Cronbach’s alpha reliability (e.g.,  $\alpha = .76$ , Heffernan & Fraley, 2014), in the current study, the items demonstrated lower alpha reliability ( $\alpha = .44$ ).

Participants also reported whether they had previously dated people of their mother’s race, father’s race, and other races. All study measures are included in Appendix C.

At the end of the study, participants re-reported on their mother’s ethnicity and father’s ethnicity as an additional verification of biracial status. In addition to their \$0.75 payment, participants received feedback about the kinds of facial features that they rated as most attractive (e.g., hair color, eye color, face shape, facial hair).

*Analytic plan.* I used multilevel modeling to analyze variation in the attractiveness ratings of the photos. The repeated measures predictors included two binary variables that represent whether the face being rated was the same ethnicity as the participant’s mother (1 = same ethnicity as mother, 0 = different ethnicity from mother) and whether the face being rated was the same ethnicity as the participant’s father (1 = same ethnicity as father, 0 = different ethnicity from father). The between-persons predictor was participant sex. This analysis estimates the main effects for mother’s ethnicity and father’s ethnicity (e.g., regardless of participant sex, the extent to which people were more or less attracted to faces that were the same ethnicity as their mother) and whether there was an interaction with participant sex (e.g., females were more attracted to faces of their father’s ethnicity than males were). These interactions between participant sex and whether a photo matched mother’s ethnicity or father’s ethnicity were the

critical tests of the psychoanalytic theory of mate preferences. The psychoanalytic theory of mate preferences predicts that these interactions exist, indicating that mother's ethnicity matters more for male participants' preferences and father's ethnicity matters more for female participants' preferences. Conversely, learning theories do not suggest that these interactions exist. The cafeteria model, on the other hand, predicts no main effects of parents' races and no interactions with participant sex, suggesting that parent characteristics are not, in fact, associated with the features that people find attractive.

I also conducted auxiliary analyses to examine the effect of diversity exposure on attraction and to test various predictions that emerge from the learning-based perspective regarding the impact of primary caregiver status, attachment security, and self-similarity on the attraction.

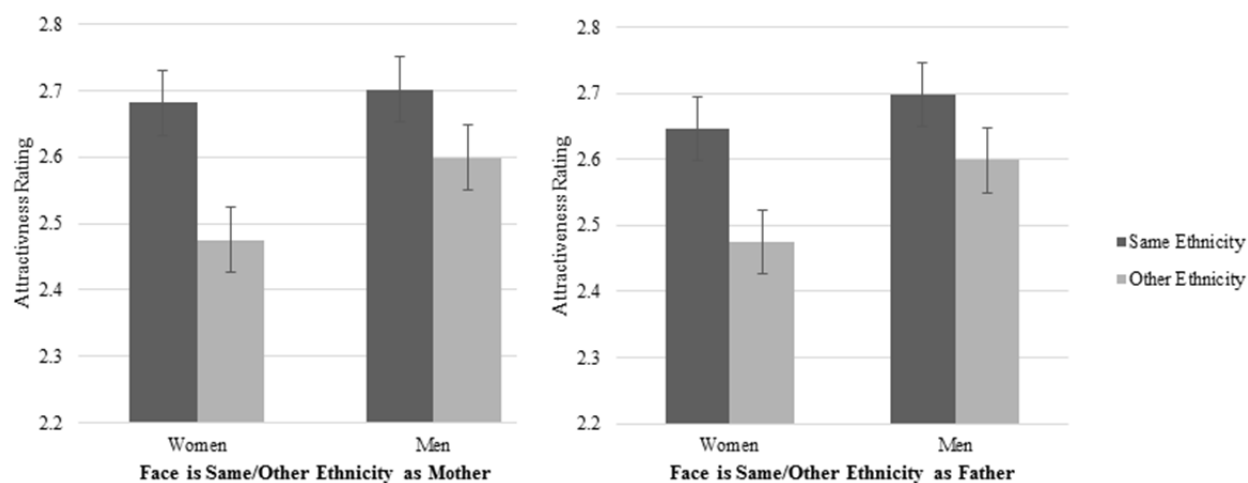
### 3.2 Results

*Primary analysis: examining whether people prefer faces of their opposite-sex parent's ethnicity.* The results from the primary multilevel model are presented in Table 3. First, this analysis revealed main effects for participant sex and whether the face matched mother and father ethnicities. Men gave higher attractiveness ratings than women,  $\gamma = 0.12$ ,  $t(509.03) = 2.34$ ,  $p = .02$ , 95% CI [0.02, 0.23]. People gave higher attractiveness ratings to faces that matched their mother's ethnicity,  $\gamma = 0.21$ ,  $t(509.51) = 6.91$ ,  $p < .01$ , 95% CI [0.15, 0.27]. Similarly, people gave higher attractiveness ratings to faces that matched their father's ethnicity,  $\gamma = 0.17$ ,  $t(507.60) = 5.79$ ,  $p < .01$ , 95% CI [0.11, 0.23]. These main effects for parent ethnicity suggest that, in general, people were more attracted to faces that matched their parents' ethnicities, consistent with the learning-based theories on mate preferences.

The critical tests of the psychoanalytic perspective, however, are the interactions between participant sex and whether the face being rated matched each parent's ethnicity. Contrary to what the psychoanalytic perspective would predict, both of these interactions had negative coefficients. For example, the interaction between participant sex and whether the photo matched mother's ethnicity was negative,  $\gamma = -0.10$ ,  $t(509.47) = -2.58$ ,  $p = .01$ , 95% CI  $[-0.18, -0.03]$ . Interpreting this finding in combination with the positive main effect of matching mother's ethnicity suggests that women (sex = 0) rated faces as more attractive if the face matched their mother's ethnicity (mom match = 1), whereas the preference for the mother's ethnicity over other ethnicities was reduced for men (sex = 1). This finding is illustrated in the first panel of Figure 2. An alternative explanation for this pattern is that women derogated other-ethnicity faces more than men did. It is important to note that although the preference for mother's ethnicity was reduced for men compared to women, it did not go away completely: men still preferred faces of their mother's ethnicity to faces of other ethnicities.

The interaction between participant sex and whether the photo matched father's ethnicity was also negative,  $\gamma = -0.07$ ,  $t(507.75) = -1.80$ ,  $p = .07$ , 95% CI  $[-0.15, 0.01]$ . Again, this suggests that women (sex = 0) rated faces that matched their father's ethnicity (dad match = 1) as more attractive than faces that did not match their father's ethnicity whereas the preference for the father's ethnicity over other ethnicities was reduced for men (sex = 1). Although the preference for father's ethnicity was reduced for men, it did not go away completely. Men still preferred faces of their father's ethnicity to faces of other ethnicities. This finding is illustrated in the second panel of Figure 2.

*Figure 2. Predicted Values for Attractiveness Ratings of Faces of Same and Other Ethnicities with Respect to Participants' Mothers and Fathers*



*Note.* Error bars are based on the pooled standard error.

The results of the primary analysis suggest that both men and women were more attracted to faces that matched one of their parents' ethnicities. However, the preference for parent ethnicity over other ethnicities was less pronounced for men than it was for women.<sup>2</sup>

*Examining the impact of the primary caregiver.* A subsample of 317 participants reported on their primary caregiver. Of these participants, 120 (38.2%) indicated that their mother was their primary caregiver, 12 (3.8%) indicated that their father was their primary caregiver, 169 (53.8%) indicated that both parents had equal roles in raising the participant, and 13 (4.1%) indicated that someone else was their primary caregiver. The pre-registered analysis was to assess whether people who indicated that one of their parents was their primary caregiver demonstrated a preference for that parent's ethnicity. However, because so few participants

<sup>2</sup> I also conducted the primary analysis in two separate multilevel models: one with respect to mother's ethnicity and one with respect to father's ethnicity. The results demonstrated the same pattern as when mother's ethnicity and father's ethnicity were included in the same model.

indicated that their father was their primary caregiver, it was not feasible to examine the impact of father as the primary caregiver. Instead, I conducted an analysis that examined whether only the mother was the primary caregiver (coded as 0,  $N = 120$ ) or both mother and father were primary caregivers (coded as 1,  $N = 169$ ). I also included the interactions between caregiver (0 = mother only, 1 = mother and father) and whether the face matched the mother's ethnicity and father's ethnicity. The full results of the model are presented in Table 4. First, people who reported that both their mother and father were primary caregivers gave lower attractiveness ratings overall compared with people who reported that only their mother was their primary caregiver,  $\gamma = -0.16$ ,  $t(285.02) = -2.27$ ,  $p = .02$ , 95% CI  $[-0.31, -0.02]$ . Second, based on the learning theories, it might be expected that people who reported that both their mother and father were both primary caregivers would demonstrate an increased preference for faces of the father's ethnicity compared with individuals who reported that their mother was their only primary caregiver because people in the former group may have had greater exposure to the father than people in the latter group. However, people who were raised by both mother and father did not show a greater preference for faces of the father's ethnicity over other ethnicities compared with people who were raised primarily by their mothers,  $\gamma = 0.03$ ,  $t(283.95) = 0.54$ ,  $p = .59$ , 95% CI  $[-0.08, 0.14]$ . Preference for the mother's ethnicity was also not moderated by primary caregiver,  $\gamma = 0.01$ ,  $t(285.25) = 0.15$ ,  $p = .88$ , 95% CI  $[-0.10, 0.11]$ . In summary, these findings do not support the learning-based prediction that the preference for parent ethnicity is stronger for the primary caregiver than other caregivers.

*Examining the impact of parental attachment.* In the primary analysis, if a face matched either mother's or father's ethnicity, it was rated as more attractive. To examine whether parental attachment was associated with people's preferences for faces of their mother's and father's

ethnicities, I tested whether attachment with the respective parent moderates the effect of that parent's ethnicity. All attachment variables were grand-mean centered. In the first model I included main effects for attachment avoidance with mother and attachment anxiety with mother, and I included the interactions between these two variables and whether the face matched the mother's ethnicity. The results of the full model are presented in Table 5. Attachment avoidance with mother did not impact overall attractiveness ratings,  $\gamma = 0.00$ ,  $t(509.30) = 0.04$ ,  $p = .97$ , 95% CI [-0.03, 0.04] and attachment anxiety with mother did not impact overall attractiveness ratings,  $\gamma = 0.00$ ,  $t(509.19) = -0.26$ ,  $p = .80$ , 95% CI [-0.04, 0.03]. However, attachment avoidance moderated the effect of mother ethnicity such that experiencing greater attachment avoidance with one's mother was associated with lower ratings for faces that matched mother's ethnicity,  $\gamma = -0.03$ ,  $t(509.61) = -2.04$ ,  $p = .04$ , 95% CI [-0.05, 0.00]. Attachment anxiety did not moderate the effect of mother ethnicity,  $\gamma = 0.02$ ,  $t(509.79) = 1.33$ ,  $p = .18$ , 95% CI [0.00, 0.05].

The second model was the same as the first except with respect to father attachment. The results of the full model are presented in Table 6. Avoidance with father did not have a main effect on attractiveness ratings,  $\gamma = 0.00$ ,  $t(507.99) = -0.01$ ,  $p = .99$ , 95% CI [-0.03, 0.03]; nor did anxiety with father,  $\gamma = 0.02$ ,  $t(507.98) = 1.33$ ,  $p = .18$ , 95% CI [-0.01, 0.05]. Additionally, attachment avoidance with father did not moderate the effect of father's ethnicity,  $\gamma = -0.01$ ,  $t(507.41) = -0.66$ ,  $p = .51$ , 95% CI [-0.03, 0.02]; nor did attachment anxiety with father,  $\gamma = 0.00$ ,  $t(507.42) = 0.36$ ,  $p = .72$ , 95% CI [-0.02, 0.03].

Taken together, these results suggest that people's preference for faces of the mother's ethnicity depended on the quality of their attachment to her. People who experienced more attachment avoidance with their mother – who were less comfortable with emotional closeness

with her – were less attracted to faces of the mother’s ethnicity. Conversely, people’s preference for faces of the father’s ethnicity was not qualified by attachment with the father.

*Examining the impact of self-similarity.* To test the alternative explanation that preferences are guided by self-similarity, I conducted a multilevel analysis to determine whether self-identifying more with one parent’s ethnicity than the other parent’s ethnicity is associated with preferences. Participants were asked whether they self-identified more one parent’s racial group and they had three response options: 1) my mother’s, 2) my father’s, or 3) I self-identify with my mother’s and father’s racial groups equally. These variables were then coded into two variables as follows: participants who identified more with their mother’s ethnicity were coded as momSelf = 1, dadSelf = 0; participants who identified more with their father’s ethnicity were coded as dadSelf = 1, momSelf = 0; participants who identified equally with both parents’ ethnicities were coded as momSelf = 0, dadSelf = 0 because they did not identify *more* with either parent.

In the multilevel model, I included these two additional variables: momSelf and dadSelf. I also included two interaction terms: one for the interaction between momSelf and whether the face being rated was the same ethnicity as the participant’s mother, and the other for the interaction between dadSelf and whether the face being rated was the same ethnicity as the participant’s father. The full results for this model are presented in Table 7. Results indicated that people who self-identified more with their mother’s ethnicity group gave lower attractiveness ratings overall,  $\gamma = -0.14$ ,  $t(510.73) = -2.42$ ,  $p = .02$ , 95% CI [-0.26, -0.03]. However this main effect was qualified by an interaction with whether the face matched mother’s ethnicity,  $\gamma = 0.15$ ,  $t(516.57) = 3.50$ ,  $p < .01$ , 95% CI [0.07, 0.24]: people who self-identified more with their mother showed an amplified preference for faces that matched their mother’s ethnicity. This

same pattern was not true for fathers. Specifically, self-identifying more with the father was not associated with attractiveness ratings in general,  $\gamma = -0.02$ ,  $t(511.90) = -0.37$ ,  $p = .71$ , 95% CI [-0.16, 0.11]. Nor did self-identifying with father's ethnicity impact people's preferences for faces of the father's ethnicity,  $\gamma = 0.00$ ,  $t(514.84) = 0.03$ ,  $p = .98$ , 95% CI [-0.09, 0.10]. Similar to the findings with parental attachment, the results of this auxiliary analysis suggest that the preference for the mother's ethnicity was influenced by aspects of the mother relationship but the preference for the father's ethnicity was not. In this case, people who self-identified more closely with the mother's ethnicity group showed an increased preference for faces of the mother's ethnicity. On the other hand, people who self-identified more closely with the father's ethnicity group did not show an increased preference for faces of the father's ethnicity.

*Examining the impact of diversity exposure.* To understand the impact of diversity exposure on attraction, I used scores from the three-item diversity exposure measure as predictors in the multilevel model. In hindsight, this analysis may not be sensible in the present context because the sample includes only individuals who were biracial. Biracial individuals are likely exposed to greater ethnic diversity than a sample of monoracial individuals, (e.g., the sample in which this measure was first used, Heffernan & Fraley, 2015). As such, it is not clear how the current participants interpreted the diversity exposure items such as, "Most of my classmates in grade school and high school were the same race as me." This may be one reason that the alpha reliability for scores on the diversity exposure scale is lower in the current sample than in previous work. Nonetheless, I conducted the analysis in keeping with the preregistered study plan.

I tested for a main effect of diversity exposure score in the multilevel model, and tested for interactions between diversity exposure and whether the face matched mother's ethnicity and



father's ethnicity. Diversity exposure was grand-mean centered in this model. Results suggested that having been exposed to greater diversity when growing up did not influence people's ratings of the faces in general,  $\gamma = 0.03$ ,  $t(510.07) = 1.39$ ,  $p = .17$ , 95% CI [-0.13, 0.07]. Additionally, being exposed to greater diversity was not associated with people's ratings of faces that matched their mother's ethnicity  $\gamma = -0.01$ ,  $t(510.73) = -0.86$ ,  $p = .39$ , 95% CI [-0.05, 0.02], or their ratings of faces that matched their father's ethnicity,  $\gamma = -0.01$ ,  $t(508.98) = -0.77$ ,  $p = .44$ , 95% CI [-0.04, 0.03]. The full model is presented in Table 8.

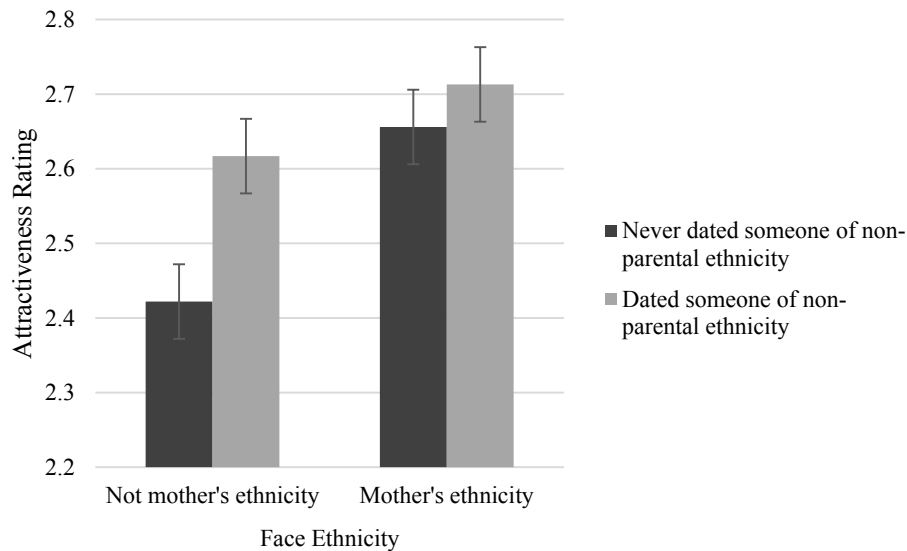
In addition to the diversity exposure measure, participants also reported on whether they had ever dated someone who was the same ethnicity as their mother, their father, or someone who was a different ethnicity than both their mother and father. I conducted two separate analyses to test whether each of these variables had a main effect on attractiveness ratings and if there were interactions with whether the face matched father's ethnicity or mother's ethnicity.

In the first model, I included main effects for having dated someone who was the same ethnicity as the participant's mother and having dated someone who was the same ethnicity as the participant's father in addition to the main effects from the primary analysis for whether the face matched a participant's mother's or father's ethnicities. I also included the interaction terms with the corresponding parent's ethnicity (e.g., having dated someone who was the same ethnicity as the participant's mother  $\times$  whether the face matched mother's race). The results of the full model are presented in Table 9. Having dated someone who was the same ethnicity as the participant's mother was not associated with attractiveness ratings,  $\gamma = -0.02$ ,  $t(504.88) = -0.38$ ,  $p = .70$ , 95% CI [-0.14, 0.09]. However, people who had dated someone of their mother's ethnicity gave higher attractiveness ratings to faces that matched their mother's ethnicity,  $\gamma = 0.27$ ,  $t(506.95) = 6.06$ ,  $p < .01$ , 95% CI [0.18, 0.35]. Having dated someone who was the same

ethnicity as the participant's father did not have a main effect on attractiveness ratings,  $\gamma = -0.04$ ,  $t(505.01) = -0.59$ ,  $p = .55$ , 95% CI  $[-0.15, 0.08]$ , but people who had dated someone of their father's ethnicity gave higher attractiveness ratings to faces that matched their father's ethnicity,  $\gamma = 0.21$ ,  $t(506.72) = 4.84$ ,  $p < .01$ , 95% CI  $[0.13, 0.30]$ .

In the second model, I included a main effect for having dated someone who was not the same ethnicity as either of a participant's parents in addition to the main effects from the primary analysis for whether the face matched a participant's mother's or father's ethnicities. I also included the interaction term between dating someone of different ethnicity and whether the face matched the mother's ethnicity and the father's ethnicity. The results for the full model are presented in Table 10. People who had dated someone who was not the same ethnicity as either of their parents rated the faces as more attractive,  $\gamma = 0.20$ ,  $t(509.03) = 3.62$ ,  $p < .01$ , 95% CI  $[0.09, 0.30]$ . Additionally, participants who had dated someone who was not the same ethnicity as either of their parents showed a greater preference for outgroup faces than people who had not dated someone of a non-parental ethnicity, and this was the case when examining ratings for other ethnicities compared with mother's ethnicity,  $\gamma = -0.14$ ,  $t(509.49) = -3.36$ ,  $p < .01$ , 95% CI  $[-0.22, -0.06]$ ; and ratings of other ethnicities compared with father's ethnicity,  $\gamma = -0.17$ ,  $t(507.72) = -4.11$ ,  $p < .01$ , 95% CI  $[-0.24, -0.09]$ . In other words, having diversifying experiences such as dating someone who does not match either parent's ethnicity appears to boost the appeal of outgroup faces. Figure 3 illustrates these findings with respect to mother's ethnicity.

*Figure 3. Predicted Values for Attractiveness Ratings of Faces of Mother's Ethnicity and Other Ethnicities for People Who Dated Someone of Non-parental Ethnicity versus Those Who Did Not*



*Note.* Error bars are based on the pooled standard error.

Although the diversity exposure measure was not associated with attraction to faces of varying ethnicities, dating history was. Having a history of dating someone of the mother's ethnicity was associated with a preference for faces that matched the mother's ethnicity, and the same pattern was found with respect to having a history of dating someone of the father's ethnicity. Having a history of dating someone who was not the same ethnicity as either of one's parents – another form of diversity exposure – was associated with greater attraction to faces in general, and with an amplified preference for faces of non-parental ethnicities.

### 3.3 Auxiliary Analyses

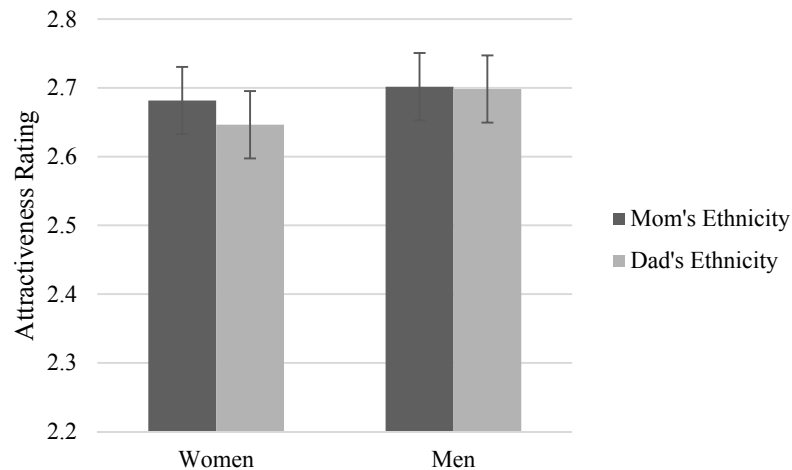
*Replicating Study 1 analysis in this sample.* Nearly half ( $N = 256$ ) of the Study 2 sample reported that they were in a romantic relationship, which made it possible to conduct a replication of the Jedlicka (1980) analyses that were conducted in Study 1 (see Table 11).

Women were equally likely to be paired with a romantic partner who matched their father's ethnicity (50%) or their mother's ethnicity (50%), and men were nearly equally likely to be paired with a romantic partner who matched their mother's ethnicity (53.8%) or their father's ethnicity (46.2%),  $\chi^2 = 0.38$ ,  $df = 1$ ,  $p = .54$ , equivalent to a correlation of  $r = 0.04$ , 95% CI [-0.08, 0.16]. These results suggest that people were not more likely to be paired with a romantic partner who matched their opposite-sex parent's ethnicity than a partner who matched their same-sex parent's ethnicity. This is consistent with the results from Study 1 in that it suggests the association between partner ethnicity and parent ethnicity is much smaller than initially estimated in Jedlicka (1980). However, one limitation of this analysis is that the sample size is substantially smaller than the samples used in Study 1 and in the original Jedlicka (1980) study.

*The strictest test of Jedlicka's hypothesis with respect to attraction.* The results of the primary analysis suggest that people prefer faces of their mothers' and fathers' ethnicities, but not in the sex-specific direction that Jedlicka might have predicted. It is important to remember though, that the primary analysis included people's ratings of faces that did not match their mother's or their father's ethnicities. The most direct extension of Jedlicka's (1980) analysis to the study of attraction would be to compare only people's ratings of faces that matched their mother's ethnicity with their ratings of faces that matched their father's ethnicity, and to ignore ratings of other ethnicities. For the sake of completeness, I ran a multilevel model that included participant sex as the between-persons variable and a dummy variable that indicated whether the photo matched the mother's ethnicity (1) or the father's ethnicity (0) as the within-person's variable. I also included the cross-level interaction between these two variables, which is the critical test of the Jedlicka hypothesis. Results for the full model are presented in Table 12. People did not show a preference for one parent's ethnicity over the other,  $\gamma = 0.04$ ,  $t(509.12) =$

1.01,  $p = .31$ , 95% CI [-0.03, 0.10]. And, contrary to the Jedlicka's and the psychoanalytic perspective, women and men did not differ in terms of their preference for mother's or father's ethnicity,  $\gamma = -0.03$ ,  $t(509.16) = -0.68$ ,  $p = .50$ , 95% CI [-0.12, 0.06]. These results are illustrated in Figure 4.

*Figure 4. Predicted values for attractiveness ratings for the model comparing women's and men's ratings of faces that matched their mother's ethnicity and faces that matched their father's ethnicity, excluding ratings of other ethnicities.*



*Note.* Error bars are based on the pooled standard error.

### 3.4 Summary

The results of Study 2 indicate that people were more attracted to faces that matched their mother's ethnicity and more attracted to faces that matched their father's ethnicity. In contrast to the predictions of the psychoanalytic perspective, the preference for parent ethnicity was not stronger for the opposite-sex parent. Instead, women showed an even greater preference for faces

of their mother's and father's ethnicities compared with men, but men still preferred faces of their parents' ethnicities than faces of other ethnicities.

Additionally, attraction to mother's ethnicity and father's ethnicity was not amplified if the parent was considered a primary caregiver. However, having a more secure relationship with the mother and self-identifying more with the mother's ethnicity were both associated with a stronger preference for faces of the mother's ethnicity. This qualification based on relational security and self-identification was not present for people's preferences for faces of their father's ethnicity. Being exposed to greater ethnic diversity when growing up was not associated with people's preferences, however people who had dated someone of their mother's ethnicity showed a stronger preference for faces of the mother's ethnicity and likewise, people who had dated someone of their father's ethnicity showed a stronger preference for faces of the father's ethnicity. Dating someone who did not match either of one's parents' ethnicities was associated with greater attraction to the faces overall, but was also associated with an elevated preference for outgroup faces.

Study 2 also provided an opportunity to examine with whom people were paired. Participants who were in romantic relationships were no more likely to be involved with a romantic partner who matched their opposite-sex parent's ethnicity than their same-sex parent's ethnicity. Finally, in the strictest test of Jedlicka's (1980) hypothesis extended to the realm of attraction – comparing only people's ratings of faces of their mother's ethnicity versus their ratings of faces of their father's ethnicity – people did not show a preference for one parent's ethnicity over the other. And importantly, people were not more attracted to faces of their opposite-sex parent's ethnicity than their same-sex parent's ethnicity. Instead, any overlap between parent and target ethnicity increased attractiveness ratings.

## CHAPTER 4: GENERAL DISCUSSION

### 4.1 Overview

The two studies in the present research examined the influence of parental features on adult mate preferences. Study 1 focused on romantic pairing to examine whether people were more likely to be paired with romantic partners who matched their opposite-sex parent's ethnicity than their same-sex parent's ethnicity. Study 2 focused on romantic attraction to examine whether people were more attracted to faces that matched their opposite-sex parent's ethnicity than faces that matched their same-sex parent's ethnicity.

Results from Study 1 indicated that women were more likely to be paired with a romantic partner who matched their father's ethnicity and men were more likely to be paired with a romantic partner who matched their mother's ethnicity. However, this effect was quite small and much smaller than the effect size reported in the original Jedlicka (1980) study. Thus, it appears that the tendency to pair with a romantic partner of the opposite-sex parent's ethnicity is much smaller than has been previously assumed. Additionally, these results were not robust across alternate ways of analyzing the data. When examining women and men separately, both women and men were equally likely to be paired with a partner who matched their opposite-sex parent's ethnicity as their same-sex parent's ethnicity. Moreover, these data show that both women and men were more likely to have a romantic partner who matched one of their parents' ethnicities than a romantic partner who was of a non-parental ethnicity.

Results from the primary analysis in Study 2 indicated that people were more attracted to faces that matched their mother's ethnicity and to faces that matched their father's ethnicity. People did not, however, demonstrate a preference for the opposite-sex parent's ethnicity over the same-sex parent's ethnicity. Instead, the preference for mother's ethnicity and for father's

ethnicity was stronger for women than for men, although men still preferred faces that matched their parents' ethnicities over faces of other ethnicities. It was also possible to examine this same issue in a way that was a more stringent test of the psychoanalytic perspective and a more direct extension of the Jedlicka (1980) analysis to attraction. To do this, people's ratings of faces of their mother's ethnicity and their father's ethnicity were compared directly, excluding people's ratings of faces that did not match either parents' ethnicities. Results of this test suggested that people did not prefer faces of one parent's ethnicity more than the other, and this was the same for both women and men. Interpreting these results in conjunction with the results of the primary analysis from Study 2 suggests that people do indeed prefer faces of their parents' ethnicities, but they do not necessarily prefer one parent's ethnicity over the other.

Additionally, people who were cared for primarily by both their mother and father were not more attracted to faces of their father's ethnicity than people who were cared for primarily by their mother. This suggests that attraction to parent ethnicities is not necessarily greater for the primary caregiver.

Interestingly, attachment security and self-identification were associated with preferences, but only with respect to the mother's ethnicity. People who had higher attachment avoidance with their mother showed a reduced preference for faces of the mother's ethnicity, but this was not the case for people's attachment with their father. Similarly, people who self-identified with their mother's ethnic group more than their father's ethnic group showed an increased preference for faces of the mother's ethnicity, but people who self-identified more with their father's ethnic group did not show an increased preference for faces of the father's ethnicity.



Finally, exposure to greater ethnic diversity per se was not associated with people's preferences, however, people who had a history of dating someone of their mother's ethnicity or their father's ethnicity showed and increased preference for faces of the respective parent's ethnicity. People who had a history dating someone who did not match either of their parents' ethnicities showed greater attraction to the faces in general and an amplified preference for faces of non-parental ethnicities.

The present studies were positioned to shed light on three perspectives on mate preferences: the psychoanalytic perspective, learning based theories, and the cafeteria model. Next, I will review briefly the three perspectives and highlight how the present findings fit within these three perspectives.

#### **4.2 Returning to the three perspectives on mate preferences**

*Psychoanalytic perspective.* The psychoanalytic perspective, emerging from Freud's work on sexuality, suggests that men will be attracted to and seek mates who resemble their mothers because the mother is the first and only "love object" for men. The mother is also the first love object for women, but women purportedly transfer the love object to the father and therefore women are expected to be attracted to and seek mates who resemble their fathers. Some of the strongest empirical evidence for this perspective came from a Jedlicka's (1980) study in which twice-married, biracial Hawaiians were more likely to be married to a spouse who matched their opposite-sex parent's ethnicity than their same-sex parent's ethnicity.

The primary findings from Study 1 were not wholly consistent with Jedlicka's (1980) findings. First, although in the primary analysis women were slightly more likely to be paired with a romantic partner who matched the father's ethnicity than men, and men were slightly more likely to be paired with a romantic partner who matched the mother's ethnicity than

women, these trends were not robust to alternate ways of analyzing the data. Second, when women and men were examined separately, people were no more likely to be paired with a partner of the opposite-sex parent's ethnicity than the same-sex parent's ethnicity. Third the effect sizes in Study 1 were drastically smaller than in Jedlicka's study. One possible cause for the difference in effect size between the current study and Jedlicka's (1980) study is that the current study used a sample of both married and dating individuals, whereas Jedlicka's study used only married participants. However this does not appear to be an adequate explanation for the difference in effect size because when the current sample was divided into subsamples of people who were married and people who were dating, the tendency to be paired with a partner who matched the opposite-sex parent's ethnicity was not stronger among married people than among dating people. Instead, the results of Study 1 point to the possibility that the influence of the opposite-sex parent was overestimated in Jedlicka's seminal work on the psychoanalytic theory of mate preferences.

Not only were people less likely to be paired with an individual of their opposite-sex parent's ethnicity than was previously thought, they also were not more attracted to faces of the opposite-sex parent's ethnicity than the same-sex parent's ethnicity. Results from Study 2 suggest that people were more attracted to faces of their mother's and their father's ethnicities, but unlike the psychoanalytic prediction, women did not show a greater preference for the father's ethnicity than men, and men did not show a greater preference for the mother's ethnicity than women. Instead, compared with men, women had an increased preference for faces of their mother's and father's ethnicities.

Why might the preference for parent similarity be greater for women than men? One potential explanation emerges from evolutionary psychology. The investment principle posits

that women's greater investment in offspring relative to men has led women to be more selective when choosing a mate (Trivers, 1985). It is possible that this greater selectivity begins at the earliest stage of mate selection, namely, attraction. In Study 2, men gave higher attractiveness ratings overall, implying lower selectivity than women. Moreover, women's increased preference for faces that matched their parents' ethnicities might be a manifestation of more finely-tuned selectivity, specifically for faces that are more similar to one's parents and thus more familiar.

Another potential explanation for women's greater preference for parent similarity relative to men is that family relationships may be more central to the lives of women than men (Antonucci, 1990; Fingerman, 2003; Goetting, 1990). Therefore it is possible that women's preferences are more tethered to parental characteristics than men's preferences. Additionally, it is possible that women were more attracted to parent-similar others because parent similarity may be taken as a cue for similarity in family dynamic, which may be more appealing to women than to men.

In any case, the findings with respect to women's and men's preferences for faces of their parents' ethnicity did not support the psychoanalytic theory of mate preferences. Taken together, the findings from the present research suggest that people prefer parent-similar others, but people do not show a greater preference for the opposite-sex parent than the same-sex parent as predicted by the psychoanalytic perspective.

*Learning based theories.* Unlike the psychoanalytic perspective, the learning based theories do not predict that people's romantic preferences will be more closely associated with the opposite-sex parent than the same-sex parent. Results from both of the present studies support the learning based-theories. In Study 1, men and women were nearly equally likely to be

paired with a romantic partner who matched their opposite-sex parent's ethnicity as their same-sex parent's ethnicity and, more importantly, both men and women were overwhelmingly more likely to be paired with a romantic partner who matched at least one of their parent's ethnicities than a romantic partner who was of a non-parental ethnicity. In Study 2, both men and women preferred faces of their parents' ethnicities, but they did not show a greater preference for faces of the opposite-sex parent's ethnicity.

Further analysis revealed that contrary to the learning-based prediction, people did not show a preference for the primary caregiver's ethnicity. This suggests that regardless of caregiver status, people preferred others of their parents' ethnicities. It is worth noting that this analysis was conducted on a smaller sample than the primary analysis in Study 2 because not all participants completed the follow-up item assessing who their primary caregiver was.

Based on animal research (Ten Cate, 1985) and human attraction research (Bereckzei, et al., 2004; Wiszewska et al., 2007), the learning-based theories also point to the possibility that the degree to which people are attracted to parent-similar others may be enhanced if they have a higher quality relationship with the parent. Study 2 provided further evidence for this prediction with respect to mothers. People who had more secure relationships with their mothers had a greater preference for faces of the mother's ethnicity than other ethnicities. Interestingly, this was not the case for attachment with fathers.

The current research also was able to test for one major alternative explanation for why people are attracted to parent-similar others: self-similarity. This alternative explanation holds that people actually prefer others who are similar to the self, and because people tend to resemble their parents, a preference for parent-similarity is an artifact of a preference for self-similarity. Study 2 tested this alternative explanation and found that people who self-identified more with

their mother's ethnicity were more attracted to faces of the mother's ethnicity, but people who self-identified with their father's ethnicity were not more attracted to faces of the father's ethnicity. If self-similarity were driving people's preferences, it would be expected that self-identifying with the father's ethnicity would be associated with an increased preference for faces of the father's ethnicity in the same way that self-identifying with the mother's ethnicity is associated with an increased preference for faces of the mother's ethnicity. These mixed results with respect to self-identity suggest that self-similarity alone cannot completely explain people's preferences for faces of their parents' ethnicities.

It is peculiar that both parental attachment and self-identity qualified people's preference for their mother's ethnicity, but did not qualify people's preference for their father's ethnicity. This may suggest that people are attracted to father-similar others regardless of the quality of their relationship with their father and the degree to which they feel similar to their father. In other words, people's preferences for father-similar others are robust to the nuances of the father-child relationship. On the other hand, people's preference for mother-similar others may be more linked to aspects of their relationship with the mother.

Finally, previous work from the learning-based perspective has found that being exposed to greater ethnic diversity was associated with enhanced attraction to people of different ethnicities from one's own ethnicity (Heffernan & Fraley, 2015). It is possible that being exposed to greater ethnic diversity increases attraction to people of other ethnicities through a mere exposure effect. In Study 2, however, people who reported greater diversity exposure did not exhibit reduced attraction to parent ethnicities or a greater attraction to faces of non-parental ethnicities, but the diversity exposure measure may not be suitable for use in a biracial sample. An alternative way to assess diversity exposure is with participants' dating histories. People who

had dated someone of their mother's ethnicity were more attracted to faces of their mother's ethnicity and people who had dated someone of their father's ethnicity were more attracted to faces of their father's ethnicity. Dating someone of a parent's ethnicity might be considered added exposure to individuals of that ethnicity. Perhaps this added exposure results in an even greater attraction to faces of that parent's ethnicity because they seem particularly familiar.

Dating someone who did not match either parents' ethnicities, then, might be considered another form of diversity exposure. Participants who had a history of dating someone who did not match either of their parents' ethnicities exhibited greater attraction to faces in general, and amplified attraction to faces of non-parental ethnicities compared with participants who did not have a history of dating someone of a non-parental ethnicity. Being exposed to greater diversity through dating history impacted people's preferences such that they had a greater preference for non-parental ethnicities.

*Cafeteria model.* The cafeteria model posits that mate preferences are largely unpredictable and random. The predictions based on this model were that there would be no associations between parent ethnicity and romantic partner ethnicity or attraction to faces of varying ethnicities. Contrary to these predictions, both studies in the present research found evidence that parental characteristics are associated with people's mate preferences. In Study 1, many more people were paired with a romantic partner who matched one of their parents' ethnicities than a romantic partner who was a different ethnicity from both of their parents. In Study 2, people were more attracted to faces of their parents' ethnicities over other ethnicities. Taken together, results from these two studies suggest that although the associations between parental characteristics and mate preferences may be subtle, people prefer to pair with and are more attracted to parent-similar others.

### 4.3 Limitations and future directions

Collectively, the present research provides evidence in support of the learning-based theories of mate preferences, rather than psychoanalytic perspective or the cafeteria model. However, one crucial component of the learning based theories such as sexual imprinting is the expectation that mate preferences are acquired during a sensitive period in early life. The current research was not designed to test whether there exists a sensitive period for human mate preferences and only one study on human attraction has provided evidence for such a sensitive period in mate preferences (Enquist et al., 2011). Future research should aim to uncover whether a sensitive period for human mate preferences exists, and if so, at what stage it occurs.

Another limitation was the proportions of parents' ethnicities. Although the samples in Study 1 and Study 2 comprised only biracial individuals, there was still a bias toward Caucasian/White parents. In Study 1, 48.7% of the sample had Caucasian mothers and 44.6% of the sample had Caucasian fathers. In Study 2, 37.9% of the sample had Caucasian mothers and 46.2% of the sample had Caucasian fathers. Although Caucasian was the biggest ethnicity group for people's mothers and fathers, these proportions of Caucasian parents are much smaller than the proportions typically seen in most psychological research in which samples have a majority of Caucasian participants (Gosling et al., 2004).

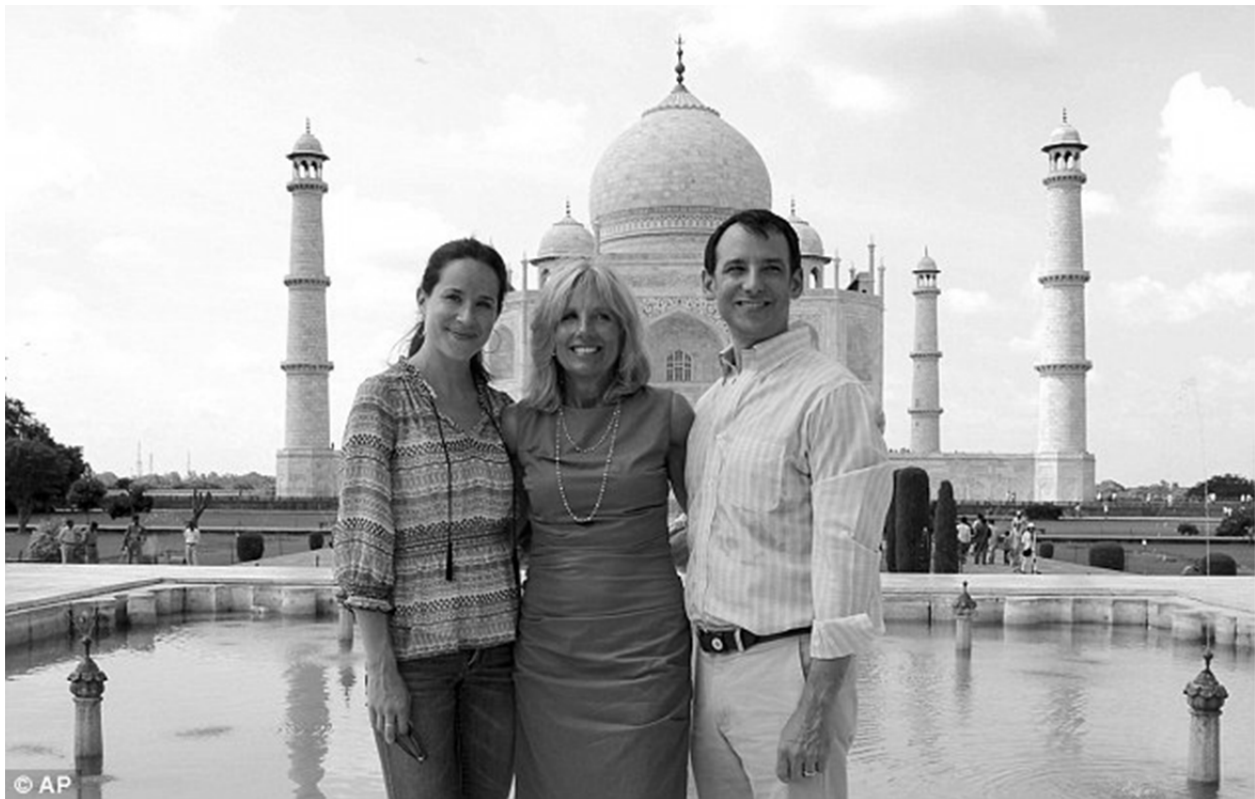
Finally, the two studies presented here have a very narrow focus in terms of the parental characteristics examined. These studies focused on parent ethnicity and preferences. However, the parental features that are associated with adult mate preferences are likely innumerable. Parental ethnicity is a reasonable characteristic to start with because it is a parental characteristic that is relatively easy to assess retrospectively, and not likely prone to retrospective biases.

Nonetheless, it would be beneficial for future work to examine other physical and psychological parental characteristics and how they are associated with adult mate preferences.

#### 4.4 Conclusion

The features that people are attracted to and that they seek in romantic partners appear to be based, in part, on the features of their parents. Rather than suggesting that mate preferences are largely random and unpredictable or that they are primarily based on the opposite-sex parent, the current findings support the perspective that people prefer others who resemble either of their parents. Therefore, it is possible that Ashley Biden was romantically attracted to her husband, Howard Krein, not just because he resembles her father, but because he shares some features with her mother, Jill Biden, as well (see Figure 5).

*Figure 5. Ashley Biden, her mother Jill Biden, and husband Howard Krein.*





## TABLES

*Table 1. Study 1 Results from the Chi-Square Test Examining Spouse and Parent Ethnicity*

*Matching by Participant Sex*

Ethnicity Match		Participant Sex	
		<u>Women</u>	<u>Men</u>
Mom and Partner Ethnicity Match	Percent within Participant Sex	48.6%	55.4%
	Count	376	139
	Expected Count	388.9	126.1
Dad and Partner Ethnicity Match	Percent within Participant Sex	51.4%	44.6%
	Count	398	112
	Expected Count	385.1	124.9

*Table 2. Study 2 Aggregate Data for Stimuli Selection*

Selected Photo Race	Average Difference Score with Other Race Ratings for Each Photo				Average Attractiveness Rating ( <i>SD</i> )
	<u>Asian</u>	<u>Black</u>	<u>Caucasian</u>	<u>Latina/o</u>	
Female Photos					
Asian	-	5.81	4.01	4.38	2.70 (0.23)
Black	5.31	-	7.71	5.23	2.70 (0.34)
Caucasian	8.17	8.61	-	4.68	2.70 (0.35)
Latina	1.22	1.82	0.84	-	2.69 (0.40)
Male Photos					
Asian	-	3.14	3.04	2.54	2.40 (0.43)
Black	10.59	-	11.17	6.38	2.45 (0.53)
Caucasian	8.09	8.31	-	4.38	2.42 (0.44)
Latino	1.25	1.82	1.23	-	2.58 (0.42)

*Table 3. Study 2 Primary Analysis: Parameter Estimates for Predicting Attractiveness Ratings for Faces*

	Estimate	S.E.	df	t	p	95% CI
Within-Subjects						
Intercept	2.47	0.04	509.01	62.78	0.00	2.40, 2.55
Face Same Ethnicity as Mother	0.21	0.03	509.51	6.91	0.00	0.15, 0.27
Face Same Ethnicity as Father	0.17	0.03	507.60	5.79	0.00	0.11, 0.23
Between-Subjects						
Participant sex	0.12	0.05	509.03	2.34	0.02	0.02, 0.23
Cross-Level Interactions						
Face Same Eth. as Mother × Participant Sex	-0.10	0.04	509.47	-2.58	0.01	-0.18, -0.02
Face Same Eth. as Father × Participant Sex	-0.07	0.04	507.75	-1.80	0.07	-0.15, -0.01

*Table 4. Study 2 Parameter Estimates for Predicting Attractiveness Ratings Including Primary Caregiver Variables as Predictors*

	Estimate	S.E.	df	t	p	95% CI
Within-Subjects						
Intercept	2.64	0.06	285.00	47.81	0.00	2.54, 2.76
Face Same Ethnicity as Mother	0.13	0.04	285.17	3.27	0.00	0.05, 0.21
Face Same Ethnicity as Father	0.12	0.04	283.86	2.87	0.00	0.04, 0.21
Between-Subjects						
Caregiver (0 = mom, 1 = mom and dad)	-0.16	0.07	295.02	-2.27	0.02	-0.31, -0.02
Cross-Level Interactions						
Face Same Eth. as Mother × Caregiver	0.01	0.05	285.25	0.15	0.88	-0.10, 0.11
Face Same Eth. as Father × Caregiver	0.03	0.06	283.95	0.54	0.59	-0.08, 0.14

*Table 5. Study 2 Parameter Estimates for Predicting Attractiveness Ratings Including Attachment Avoidance and Anxiety with Mother as Predictors*

	Estimate	<i>S.E.</i>	<i>df</i>	<i>t</i>	<i>p</i>	95% CI
Within-Subjects						
Intercept	2.54	0.03	509.45	95.98	0.00	2.49, 2.59
Face Same Ethnicity as Mother	0.15	0.02	509.85	7.39	0.00	0.11, 0.19
Face Same Ethnicity as Father	0.13	0.02	509.73	6.67	0.00	0.09, 0.17
Between-Subjects						
Attachment Avoidance with Mother	0.00	0.02	509.30	0.04	0.97	-0.03, 0.04
Attachment Anxiety with Mother	0.00	0.02	509.19	-0.26	0.80	-0.04, 0.03
Cross-Level Interactions						
Face Same Eth. as Mother $\times$ Avoidance	-0.03	0.01	509.61	-2.04	0.04	-0.05, 0.00
Face Same Eth. as Father $\times$ Anxiety	0.02	0.01	509.79	1.33	0.18	-0.01, 0.05

*Table 6. Study 2 Parameter Estimates for Predicting Attractiveness Ratings Including Attachment Avoidance and Anxiety with Father as Predictors*

	Estimate	S.E.	df	t	p	95% CI
Within-Subjects						
Intercept	2.54	0.03	508.25	96.06	0.00	2.49, 2.59
Face Same Ethnicity as Mother	0.15	0.02	510.45	7.34	0.00	0.11, 0.19
Face Same Ethnicity as Father	0.13	0.02	506.98	6.69	0.00	0.09, 0.17
Between-Subjects						
Attachment Avoidance with Father	0.00	0.02	507.99	-0.01	0.99	-0.03, 0.03
Attachment Anxiety with Father	0.02	0.02	507.98	1.33	0.18	-0.01, 0.05
Cross-Level Interactions						
Face Same Eth. as Mother $\times$ Avoidance	-0.01	0.01	507.41	-0.66	0.51	-0.03, 0.02
Face Same Eth. as Father $\times$ Anxiety	0.00	0.01	507.42	0.36	0.72	-0.02, 0.03

*Table 7. Study 2 Parameter Estimates for Predicting Attractiveness Ratings Including Self-Identity Variables as Predictors*

	Estimate	S.E.	df	t	p	95% CI
Within-Subjects						
Intercept	2.59	0.04	546.65	74.04	0.00	2.52, 2.66
Face Same Ethnicity as Mother	0.11	0.02	527.90	4.71	0.00	0.06, 0.15
Face Same Ethnicity as Father	0.13	0.02	522.05	5.98	0.00	0.09, 0.17
Between-Subjects						
Self-Identify with Mother's Ethnicity	-0.14	0.06	510.73	-2.42	0.02	-0.26, -0.03
Self-Identify with Father's Ethnicity	-0.03	0.07	511.90	-0.37	0.71	-0.16, 0.11
Cross-Level Interactions						
Face Same Eth. as Mother $\times$ Self ID Mom	0.15	0.04	516.57	3.50	0.00	0.07, 0.24
Face Same Eth. as Father $\times$ Self ID Dad	0.00	0.05	514.84	0.03	0.98	-0.09, 0.10

*Table 8. Study 2 Parameter Estimates for Predicting Attractiveness Ratings Including Diversity Exposure as a Predictor*

	Estimate	S.E.	df	t	p	95% CI
Within-Subjects						
Intercept	2.54	0.03	510.03	96.23	0.00	2.49, 2.60
Face Same Ethnicity as Mother	0.15	0.02	510.45	7.37	0.00	0.11, 0.19
Face Same Ethnicity as Father	0.13	0.02	508.71	6.67	0.00	0.09, 0.17
Between-Subjects						
Diversity Exposure	0.03	0.02	510.07	1.39	0.17	-0.01, 0.07
Cross-Level Interactions						
Face Same Eth. as Mother $\times$ Diversity Exp.	-0.01	0.02	510.73	-0.86	0.39	-0.05, -0.02
Face Same Eth. as Father $\times$ Diversity Exp.	-0.01	0.02	508.98	-0.77	0.44	-0.04, -0.02

*Table 9. Study 2 Parameter Estimates for Predicting Attractiveness Ratings with Dated Someone of Mother's and Father's Ethnicity as Predictors*

	Estimate	S.E.	df	t	p	95% CI
Within-Subjects						
Intercept	2.59	0.07	551.47	39.72	0.00	2.46, 2.72
Face Same Ethnicity as Mother	-0.06	0.04	531.70	-1.42	0.16	-0.13, 0.02
Face Same Ethnicity as Father	-0.03	0.04	531.81	-0.74	0.46	-0.11, 0.05
Between-Subjects						
Dated Someone of Mother's Ethnicity	-0.02	0.06	504.88	-0.38	0.70	-0.14, 0.10
Dated Someone of Father's Ethnicity	-0.04	0.06	505.01	-0.59	0.55	-0.15, 0.08
Cross-Level Interactions						
Face Same Eth. as Mother $\times$ Dated M. Eth.	0.27	0.04	506.95	6.06	0.00	0.18, 0.35
Face Same Eth. as Father $\times$ Dated F. Eth.	0.21	0.04	506.72	4.84	0.00	0.13, 0.30

*Table 10. Study 2 Parameter Estimates for Predicting Attractiveness Ratings with Dated Someone of Non-Parental Ethnicity as a Predictor*

	Estimate	S.E.	df	t	p	95% CI
Within-Subjects						
Intercept	2.42	0.04	509.02	56.98	0.00	2.33, 2.51
Face Same Ethnicity as Mother	0.23	0.03	509.52	7.23	0.00	0.17, 0.30
Face Same Ethnicity as Father	0.23	0.03	507.58	7.39	0.00	0.17, 0.30
Between-Subjects						
Dated Someone of Non-Parental Ethnicity	0.20	0.05	509.03	3.62	0.00	0.09, 0.30
Cross-Level Interactions						
Face Same Eth. as Mother $\times$ Dated NP Eth.	-0.14	0.04	509.49	-3.36	0.00	-0.22, -0.06
Face Same Eth. as Father $\times$ Dated NP Eth.	-0.17	0.04	507.72	-4.11	0.00	-0.25, -0.09

*Table 11. Study 2 Replication of Study 1 (Jedlicka, 1980) Analysis*

Ethnicity Match		Participant Sex	
		<u>Women</u>	<u>Men</u>
Mom and Partner Ethnicity Match	Percent within Participant Sex	50.0%	53.8%
	Count	63	70
	Expected Count	65.5	67.5
Dad and Partner Ethnicity Match	Percent within Participant Sex	50.0%	46.2%
	Count	63	60
	Expected Count	60.5	62.5

*Table 12. Study 2 Parameter Estimates for Predicting Attractiveness Ratings Including only Faces that Matched Either Mother's or Father's Ethnicity*

	Estimate	<i>S.E.</i>	<i>df</i>	<i>t</i>	<i>p</i>	95% CI
Within-Subjects						
Intercept	2.64	0.04	508.98	64.84	0.00	2.57, 2.73
Face Ethnicity (1 = mother's, 0 = father's)	0.04	0.03	509.12	1.01	0.31	-0.03, 0.10
Between-Subjects						
Participant Sex	0.05	0.06	509.05	0.95	0.34	-0.06, 0.16
Cross-Level Interactions						
Face Ethnicity $\times$ Participant Sex	-0.03	0.05	509.16	-0.68	0.50	-0.12, 0.06

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## Appendix A: Study 1 Items

1. Are you biracial?

☐ Yes      ☐ No

2. What is your mother's ethnicity?

- ☐ African American
  - ☐ Alaskan Native
  - ☐ American Indian
  - ☐ Black
  - ☐ Chinese
  - ☐ Cuban
  - ☐ English
  - ☐ Filipino
  - ☐ German
  - ☐ Guamanian or Chomorro
  - ☐ Indian
  - ☐ Irish
  - ☐ Italian
  - ☐ Japanese
  - ☐ Korean
  - ☐ Mexican
  - ☐ Middle Eastern (e.g., Iraqi, Qatari)
  - ☐ Native Hawaiian
  - ☐ Other Asian (e.g., Malaysian, Indonesian, Thai)
  - ☐ Other Central America origin (e.g., Nicaraguan, Salvadoran)
  - ☐ Other European origin
  - ☐ Other Pacific Islander (e.g., Tongan, Fijian)
  - ☐ Pakistani
  - ☐ Polish
  - ☐ Puerto Rican
  - ☐ Samoan
  - ☐ South American origin (e.g., Argentine, Brazilian, Chilean, Colombian)
  - ☐ Spanish origin
  - ☐ Vietnamese
  - ☐ White or Caucasian
  - ☐ Some other racial category
- > Please type your racial or ethnic background below
-

## 3. What is your father's ethnicity?

- ☐ African American
- ☐ Alaskan Native
- ☐ American Indian
- ☐ Black
- ☐ Chinese
- ☐ Cuban
- ☐ English
- ☐ Filipino
- ☐ German
- ☐ Guamanian or Chomorro
- ☐ Indian
- ☐ Irish
- ☐ Italian
- ☐ Japanese
- ☐ Korean
- ☐ Mexican
- ☐ Middle Eastern (e.g., Iraqi, Qatari)
- ☐ Native Hawaiian
- ☐ Other Asian (e.g., Malaysian, Indonesian, Thai)
- ☐ Other Central America origin (e.g., Nicaraguan, Salvadoran)
- ☐ Other European origin
- ☐ Other Pacific Islander (e.g., Tongan, Fijian)
- ☐ Pakistani
- ☐ Polish
- ☐ Puerto Rican
- ☐ Samoan
- ☐ South American origin (e.g., Argentine, Brazilian, Chilean, Colombian)
- ☐ Spanish origin
- ☐ Vietnamese
- ☐ White or Caucasian
- ☐ Some other racial category

-> Please type your racial or ethnic background below

---

## 4. What is your spouse's ethnicity?

- ☐ African American
- ☐ Alaskan Native
- ☐ American Indian
- ☐ Black
- ☐ Chinese
- ☐ Cuban
- ☐ English
- ☐ Filipino
- ☐ German
- ☐ Guamanian or Chomorro
- ☐ Indian
- ☐ Irish
- ☐ Italian
- ☐ Japanese
- ☐ Korean
- ☐ Mexican
- ☐ Middle Eastern (e.g., Iraqi, Qatari)
- ☐ Native Hawaiian
- ☐ Other Asian (e.g., Malaysian, Indonesian, Thai)
- ☐ Other Central America origin (e.g., Nicaraguan, Salvadoran)
- ☐ Other European origin
- ☐ Other Pacific Islander (e.g., Tongan, Fijian)
- ☐ Pakistani
- ☐ Polish
- ☐ Puerto Rican
- ☐ Samoan
- ☐ South American origin (e.g., Argentine, Brazilian, Chilean, Colombian)
- ☐ Spanish origin
- ☐ Vietnamese
- ☐ White or Caucasian
- ☐ Some other racial category

-> Please type your racial or ethnic background below

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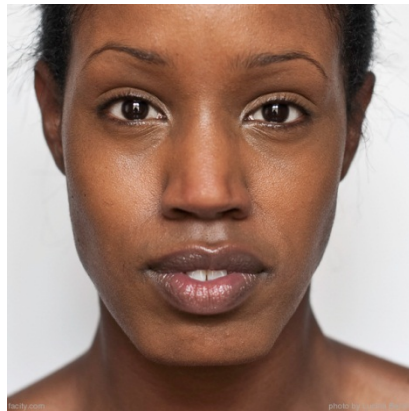


## Appendix B: Study 2 Example Photographic Stimuli

### Example Male Faces



### Example Female Faces



## Appendix C: Study 2 Items

### Demographic Information

1. Are you biracial?

☐ Yes

☐ No

2. What is your mother's ethnicity?

☐ Asian/Pacific Islander

☐ Black/African American

☐ Caucasian/White

☐ Latino or Spanish origin

☐ Middle Eastern

☐ American Indian or Alaska Native

☐ Native Hawaiian or other Pacific Islander

☐ Some other racial group

3. What is your father's ethnicity?

☐ Asian/Pacific Islander

☐ Black/African American

☐ Caucasian/White

☐ Latino or Spanish origin

☐ Middle Eastern

☐ American Indian or Alaska Native

☐ Native Hawaiian or other Pacific Islander

☐ Some other racial group

4. What is your romantic partner's racial or ethnic background?

☐ Asian/Pacific Islander

☐ Black/African American

☐ Caucasian/White

☐ Latino or Spanish origin

☐ Middle Eastern

☐ American Indian or Alaska Native

☐ Native Hawaiian or other Pacific Islander

☐ Some other racial group

5. Do you self-identify more with one parent's racial group?

☐ Yes, my mother's

☐ Yes, my father's

☐ No, I self-identify with my mother's and father's racial groups equally.

6. Did anyone else play a major role in raising you when you were growing up?

☐ My step-father

☐ My step-mother

☐ A female relative (e.g., grandmother, aunt)

☐ A male relative (e.g., grandfather, uncle)

☐ No, I was primarily raised by my mother and father.

**Experiences in Close Relationships – Relationships Structures Questionnaire (ECR-RS: Fraley, Heffernan, Vicary, & Brumbaugh, 2011)**

Instructions: Please answer the following 9 questions about your \_\_\_\_\_.

1. I usually discuss my problems and concerns with this person.
2. I talk things over with this person.
3. It helps to turn to this person in times of need.
4. I find it easy to depend on this person.
5. I prefer not to show this person how I feel deep down.
6. I don't feel comfortable opening up to this person.
7. I'm afraid this person may abandon me.
8. I worry that this person won't care about me as much as I care about him or her.
9. I often worry that this person doesn't really care for me.

(Note. Participants will complete this questionnaire separately for their mother and their father. Each item is rated on a 1 [strongly disagree] to 5 [strongly agree] scale. Items 1-6 assess attachment avoidance. Items 7-9 assess attachment anxiety.)

**Diversity Exposure Measure (Heffernan & Fraley, 2014)**

Instructions: Please rate how much you agree or disagree with each of the following statements.

1. Growing up, I had friends who were of different racial backgrounds than me.
2. Most of my classmates in grade school and high school were of the same race as me.
3. The community I grew up in was racially diverse.

Note. Each item is rated on a 7-point Likert scale (1 = strongly disagree; 7 = strongly agree). I will reverse score the second item and average responses on all three for a composite diversity exposure measure.

**Dating History Items**

1. In the past, have you dated people who were the same race as your mom? (yes/no)
2. In the past, have you dated people who were the same race as your dad? (yes/no)
3. In the past, have you dated people who were different races than both your mom and your dad? (yes/no)

**Primary Caregiver Follow-up Question**

1. Who was your primary caregiver when you were growing up?

☐ my mom

☐ my dad

☐ both my mom and my dad had equal roles in raising me

☐ someone else